The Mining Journal
Established 1835
Railway & Commercial Gazette
Vol. CCXXXVIII No. 6092 LONDON, MAY 23, 1952 PRICE 8d

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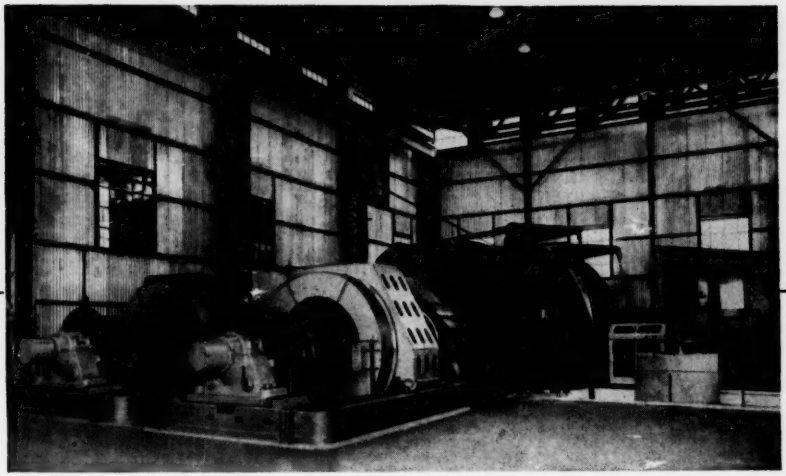

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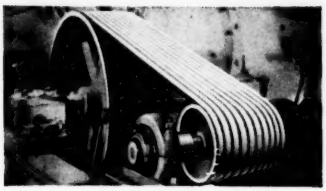

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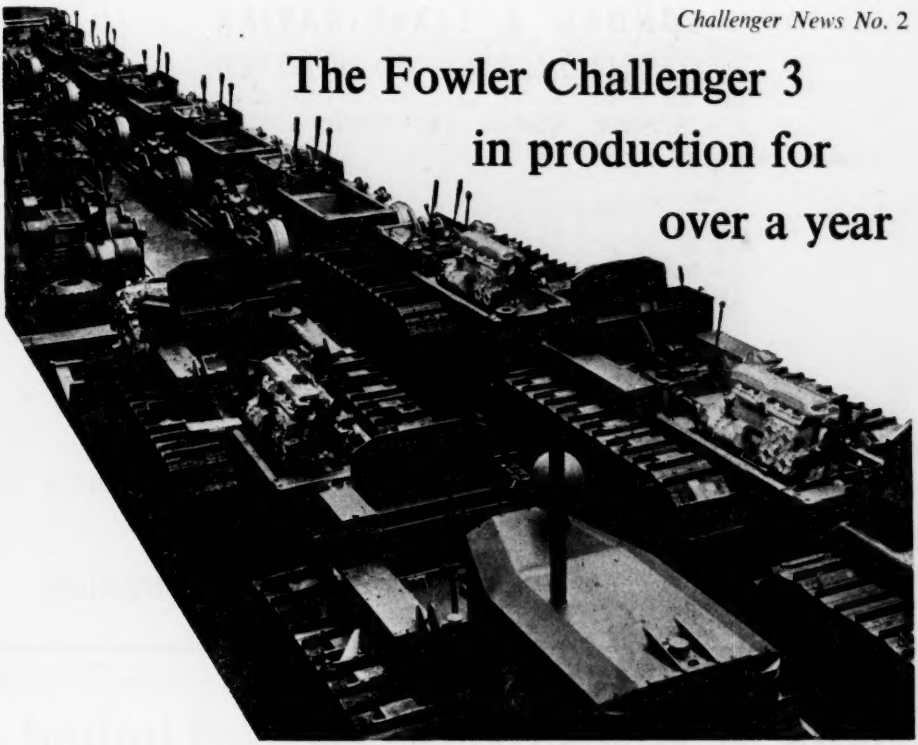

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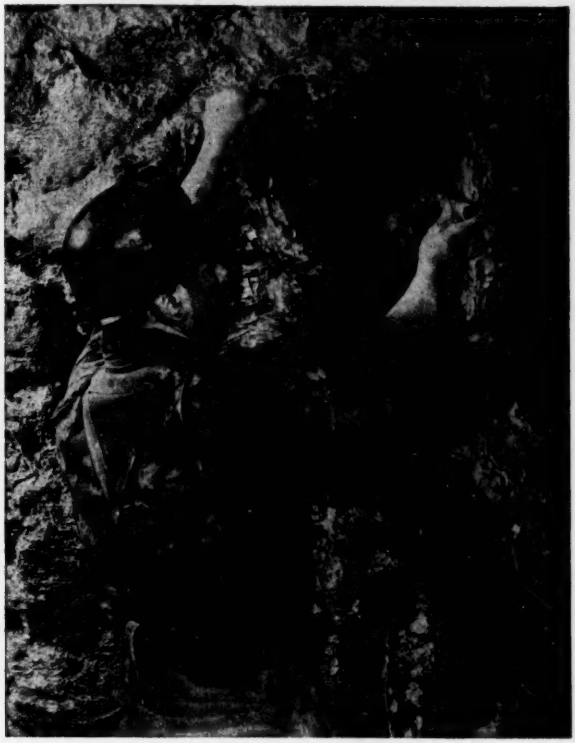

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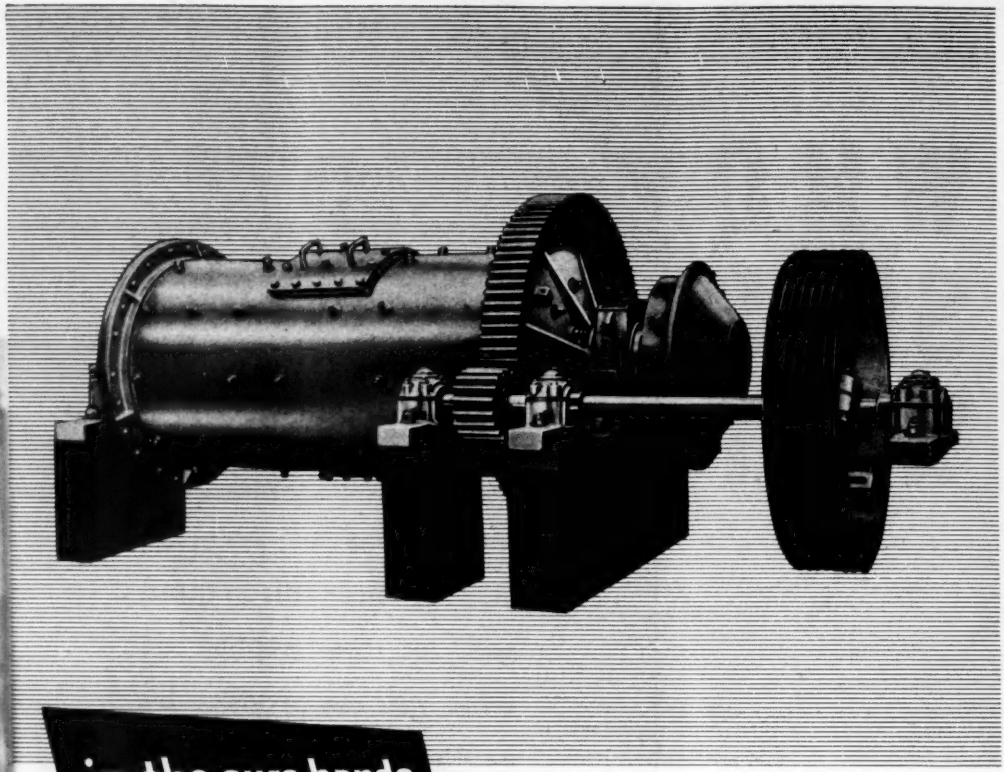

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The Mining Journal
Established 1835

Vol. CCXXXVIII No. 6092 LONDON, MAY 23, 1952 Price 8d

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Published by The Mining Journal Ltd. at 15, George Street, London, E.C.4. *Subscription £2 per annum (post free)*

NOTES AND COMMENTS

International Aspect of the Bauxite Industry

It is now widely established that considerable activity in North-western British Columbia will eventually result in the annual production of 550,000 tons of aluminium. The Canadian Transport Minister recently gave note of the development in Ottawa, and stated that the $550,000,000 project was being undertaken by the Aluminium Co. of Canada. The venue of the project is near Kitimat, and the development area will be at the head of Kitimat Arm where a seaport will be erected. In addition to the aluminium plant, the project is to include a hydro development that will produce 1,600,000 h.p. and will also open up timber development in the area. The Minister introduced legislation into the House of Commons to permit the Canadian National Railways to build a line from Terrace, British Columbia, in a northwards direction to the operational site.

The wide flung ramifications of Canadian Aluminium interests are shown by the realization that the co-operation plan for the production of aluminium between the Nippon Light Metal Co. Ltd., a leading Japanese producer, and Aluminium Ltd., of Montreal, has at the moment been held up because of strong opposition from the Japanese Finance Ministry. Involving a $3,800,000 Canadian investment in Japan, the plan means that Aluminium Ltd. would acquire 50 per cent of the shares of the Nippon Light Metal Co. Ltd. at a cost of about $2,000,000 and would also grant the Japanese company a long term loan of $1,800,000.

The Finance Ministry's representative on the Foreign Investment Commission told a meeting of the Commission that his Ministry was firmly opposed to the plan, as the design was to give 50 per cent of the shares of the Japanese company, which accounted for 60 per cent of Japan's aluminium production. The Finance Ministry believed that the plan would place one of Japan's basic industries under foreign control.

This policy is the first indication of the Finance Ministry's attitude towards the investment of foreign capital in Japan after the coming into effect of the Peace Treaty, and one which does not altogether harmonize with the Japanese Government's various statements made while the Peace Treaty was still *sub judice*.

Meanwhile Canadian reaction to plans for aluminium production in Dutch Guiana were recently said to be that the possibility of a new aluminium industry in that area would have little effect on Canadian production or sales. These comments were aroused by a Paris dispatch in which the International Bank for Reconstruction and Development recommended a $53,000,000 programme of ten-years' termination to produce aluminium in Dutch Guiana. This Netherlands South American colony is the world's largest source of bauxite.

Canadian officials said recently that if this recommendation were implemented, it would in all likelihood mean that Holland would receive her aluminium supplies from Dutch Guiana instead of from Canada. But Canadian sales to Holland have been a tiny proportion only of total shipments. Canada's own supplies of bauxite come from British Guiana, the next door neighbour of the Dutch Colony, and a small supply is anticipated from Jamaica when that country's bauxite expansion programme gets under way.

The report on the production of aluminium in Surinam in Dutch Guiana was the work of a World Bank mission sent to the area at the requests of the governments of that country and the Netherlands. The Surinam Government is urged to take immediate steps to explore the business aspects of aluminium production with aluminium producing companies.

The report indicates that the production of bauxite mining and transportation constitutes the most important single source of Governmental revenues. Production has risen steadily during the last thirteen years, and the mission expects that exports may substantially exceed 3,000,000 tons a year during the ten-year development programme. The report states: "There appears to be no technical reason why hydro-electric power cannot be produced at Brokopondo, on the Surinam River, at a cost which will premit the economical production of aluminium."

The mission recommends a programme of public investment designed to end the country's dependence on external subsidies and grants, and to be accomplished without lowering present consumption levels or social services. At

the termination of the ten-year development period, Surinam should be able to maintain a level of gross investment without extraordinary external aid, sufficient to support or raise the consumption levels of that time.

A minimum programme is outlined, which calls for the expenditure of 100,000,000 Surinam guilders ($53,000,000) between 1952 and 1962. Assuming that outside assistance will be available, the mission believes that the programme should be well within the country's means. It is considered that the resources available are likely to exceed the amount required. A supplementary programme has therefore been outlined to utilize the additional resources that prove to be available.

The mission places major emphasis on the development of Surinam's three principal productive resources; agricultural land, tropical forests, and mineral deposits, of which the primarily important is bauxite.

Aluminium Dust Makes Headway in Silicosis Battle

Evidence that further good progress has been made in the fight against silicosis is given in the annual report of the McIntyre Research Foundation for the year 1951.

The use of aluminum dust in mines and in other places where workers are exposed to silica dust is spreading rapidly. At present it is being used in the United States more than in Canada while in Mexico and Australia many thousands are also being subjected to this treatment. Industries in other countries are also investigating the possibility of its utilization.

Dr. J. W. G. Hannon, the Foundation's Washington Medical Director, gave the following testimonial of the benefits to workers using the aluminium dust treatment which was first outlined at the McIntyre gold mine in Schumacher, Ontario.

"First, that since the introduction of aluminium therapy there were no new cases of silicosis, whereas prior to the installation of aluminium new cases were appearing each year. Second, the men who already had silicosis, and the symptoms that are sometimes associated with this condition, all felt much better following treatments. They gained weight, their shortness of breath disappeared, their cough was lessened or disappeared completely, and their capacity for work was also increased. It was stated that some thought that the result was psychological and not real. However, since the improvement has lasted for five or six years in some cases, they believe the results are not psychological."

The President of the Foundation, Mr. F. D. Fox, in his report pointed out that it was eleven years since aluminium prophylaxis and therapy was first used in a practical way and it was thought that the time had now arrived for the forming of a safe appraisal of its benefits. During the coming year he said it was planned to make closer contact with those who had undergone treatment, and it was also anticipated that some figures would be available from its statistical study of the Ontario Workmen's Compensation Board records, relating to silicosis.

Where the Gold Goes

According to an article which appeared recently in the *South African Exporter*, tea services, cigarette boxes, ash trays and other articles made from South African gold and produced by three factories operating in the Transvaal are selling at the rate of £72,000,000 a year.

During the current year, the article states, the production of goldware will be the Union's No. 1 export industry. In 1950 semi-processed and processed gold worth £37,000,000 was exported, while in 1951 the total rose to £69,000,000.

Western United States

(From Our Own Correspondent)

Barstow, Cal., May 12

The Chilean Government has cancelled the copper agreement that it entered into about a year ago with the United States. This agreement provided that 80 per cent of the copper produced in Chile would be marketed in the United States at a price of 27½c. per lb., 3c. higher than the domestic price. Annual production from Chile approximates 400,000 tons, practically all from mines controlled by Anaconda and Kennecott. Chilean copper will now be shipped to the world market where higher prices are expected.

In connection with this announcement of policy by the Chilean Government, which will effect a drastic reduction of import to this country, a recent statement by Anaconda on the future of copper is of interest, although it is obvious that at the time of issuance its purpose was to combat propaganda advocating the substitution of aluminium for copper wherever possible. Anaconda states that its Greater Butte Project and its new sulphide plant at Chuquicamata will be in operation this spring and that by 1953 output from the two will amount to 95,000 tons, in addition to which the new development at Yerington, Nevada will be producing at the rate of 30,000 tons per year. This would indicate that this one company will increase its output by 125,000 tons in the next year and a half but two points must be considered in looking into the future. One is the effect that cancellation of the Chilean agreement may have on imports to the United States from Chuquicamata and the other that Greater Butte's maximum production will not be attained until 1955 so that the next three years will see an annual increase of domestic production from that source.

At the behest of the Atomic Energy Commission, the Office of Indian Affairs, which maintains close supervision over the lands and rights of the descendants of Indian aborigines, has modified its land policy to the extent that the Navajo (NA-VA-HO) Indian reservation, comprising a large area in Utah, Colorado, Arizona and New Mexico, has been opened to full scale uranium prospecting and mining and Indian owners of land are permitted to lease their holdings to non-Indian mine operators. The lands in the Navajo reservation have been found to possess greater possibilities for the development of fissionable minerals than any other similar area in the United States. The A.E.C. has also initiated a programme for the construction of 37 access roads at an expense in excess of $5,000,000 to facilitate movement of ore from the less accessible mines to the government's newly established ore-purchasing station at Shiprock, New Mexico.

ARIZONA

A recent report to stockholders of the Phelps-Dodge Corporation gives some interesting figures on the Lavender pit, now being developed and which is expected to be on production in 1954 or 1955. The ore body is estimated as 41,000,000 tons of concentrating ore of an average copper content of 1.14 per cent and 31,000,000 tons of leaching ore averaging 0.42 per cent, in round numbers a total of 600,000 tons of contained copper. To recover the above tonnage of ore 70,000,000 tons of waste will be stripped, a ratio of ore to waste of slightly over 1 per cent (1.03), a very satisfactory figure. Total cost of development and equipment is estimated at $25,000,000.

American Smelting and Refining Co. has inaugurated a $17,000,000 development and expansion programme at its Silver Bell mine in Pima County. A large low grade

ore body will be developed for open pit operation and a 10,000 ton mill erected. D.M.P.A. (Defense Minerals Procurement Agency) has underwritten the sale of 177,000,000 lb. of copper at 24½c. per lb. from this operation.

Shattuck Denn has started sinking a new 2,000 ft. shaft at its Iron King copper, lead and zinc property in Yavapai County.

CALIFORNIA

Kaiser Steel Corporation is increasing its pig iron capacity 50 per cent by adding a third blast furnace to its plant at Fontana. The annual capacity of the three furnaces will be 1,314,000 tons. The expansion programme will include another open hearth furnace, making nine in all, and two more rolling stands in the hot strip mill. This enlarged capacity will involve an increase of approximately 50 per cent in equipment and working force at the coal and iron mines and the addition of 90 coke ovens. The expansion will require a capital investment of $65,000,000.

COLORADO

Major objectives of the Leadville drainage tunnel have been reached and the current contract between the U.S. Bureau of Mines and the Utah Construction Co. has been terminated. This marks the successful completion of one of the most difficult projects of its kind undertaken in this country. The tunnel is over two miles long and most of the way was driven through heavily fractured, water soaked ground, almost impenetrable in places some of which required bypassing. It was driven south-easterly over 10,000 ft. to a point beyond the Robert Emmet shaft and then a lateral turned easterly to penetrate the Mikado fault. Original plans were for a lateral south-westerly to get under the "Downtown Basin" but in view of the surface topography mine operators and Bureau of Mines officials agreed that it would be of greater benefit to the district to drive to the New Mikado shaft and thence to the Mikado fault as greater depth of drainage would be thus secured. In round figures the cost of the project was $2,000,000 which would average out about $180 per ft. of finished tunnel.

The American Smelting and Refining Co. has leased the Robert Emmett shaft and surrounding territory from the New Jersey Zinc Co. This shaft was the first major objective of the new drainage tunnel and A.S. and R. plans to unwater and explore below the tunnel level.

In the Yak tunnel, one of the earlier Leadville drainage projects which is still in use, wooden tunnel sets are being replaced by two-piece arched steel sets. The sets are of old rails weighing 20 to 90 lb. per yd. and lagging is of war surplus landing mats. Track is being raised six inches to get it out of the water.

The Atomic Energy Commission has awarded contracts for diamond drill exploration in south-western Colorado and south-eastern Utah to determine the extent of deposits which exhibit favourable surface showings. The contracts call for a minimum of 90,000 ft. of hole and a possible maximum of 150,000 ft.

UTAH

Garfield Chemical and Manufacturing Co., subsidiary of A. S. and R. and Kennecott, has let a contract for an addition to its sulphuric acid plant at Garfield, site of A. S. and R.'s largest copper smelter. Expenditure involved will be $2,500,000 and will increase acid production from 450 to 700 tons per day. Magna mill of Kennecott, also at Garfield, is undergoing an overhaul and modernization of its electrical equipment.

U.S. Steel Co. has issued a report on iron ore "presently known and commercially mineable" in Iron and Washington Counties estimated at 200,000,000 l.tons. A previous U.S. Bureau of Mines report on the area estimated 351,000,000 l.tons as "measured, inferred or unclassified."

U.S. Smelting, Refining and Mining Co. has rounded out its extensive holdings in the Bingham district by acquiring the entire property of the Bingham-Conger Copper Co. and United Bingham Copper Co. The deal was consummated by U.S. Smelting, a stockholder in both companies, trading 20,000 shares of its stock having a market value of approximately $700,000 for the holdings of the two companies which will now be liquidated.

SOUTH DAKOTA

Homestake Mining Co., which maintains its position as the leading gold producer in the United States has increased its working time from 42 to 48 hours per week. This move is to offset a shortage in mine labour which resulted in a decrease in output of 219,000 tons in 1951 as compared with 1950 with a resultant increase in costs of 11 per cent.

NEVADA

Molybdenum Corporation of America has purchased a tract at Henderson in the Boulder Dam area for the erection of a plant to process rare earths from its newly developed deposit at Mountain Pass, California. This deposit has a surface area of 400 ft. x 1,000 ft. containing cerium and lanthanum associated with barite. Heretofore the uses of rare earths have been very limited, presumably because of their rarity, but the existence of this large deposit opens a wide field for research. Present uses are as "flints" in cigarette lighters, tracer bullets, luminescent shells, arc lamps and minor chemical compounds. Some experimentation has shown cerium and lanthanum to have uses as an alloy in small amounts in the manufacture of special steels and the Molybdenum Corporation is planning that a market can be developed in this field.

Combined Metals Reduction Co. is planning a concentrating unit at its mill at Pioche for the treatment of oxydized manganese ores and an electrolytic refinery for the concentrate at Henderson.

Kennecott is treating 20,000 tons of copper ore a day at its Nevada Consolidated Division and is sinking its Kellinske shaft on its Deep Ruth project from the 775 to the 2,245 ft. level.

Kaiser Aluminum and Chemical Corporation has purchased the Baxter fluorspar mine from H. W. Gould and Co. and is erecting a mill for processing the ore for use in aluminium manufacture as aluminium fluoride.

Anaconda has commenced construction of its 11,000 ton leaching plant at Yerington. Mining will be by open cut on an oxide ore body estimated to contain 35,000,000 tons. Sulphur will be mined at the Leviathan mine in Alpine County, California, and trucked to Yerington where it will be manufactured into acid for the leaching process. Anaconda has negotiated two agreements with the government to assist in developing the Yerington operation. One allows the company accelerated amortization of 75 per cent of its investment in five years and the other underwrites the purchase of 128,000 tons of copper during the first six years of operation at a minimum price of 25½c. per lb. The oxide ores are underlain by a sulphide ore body but as the former have an estimated life of 10½ years, work on the sulphides is not included in the present plans. The Yerington copper deposits have been known for many years and all told a large amount of money has been spent on them but this is the first time any organization with sufficient capital for a project of this size has become interested.

Pneumatic Flotation Equipment

By FRANK H. SLADE, A.M.I.Mech.E.

Low pressure air provides for maximum bubble attachment in modern flotation equipment used in the treatment of metallic ores, non-metallic minerals and many other materials. This article, reproduced by the courtesy of *Compressed Air Engineering*, reviews the operation of various types of machines in current use.

Although gravity is extensively employed in the mining industry, as in the heavy-liquid and heavy-media separation processes, to separate mixtures of solids into their constituent parts, flotation is the most important process for the separation of sulphide minerals of iron, zinc, copper, lead, etc., from the accompanying gangue minerals, and this method is employed exclusively in many of the larger ore-dressing stations.

The reason given[1] for this is that in many cases of ore-dressing the difference between the specific gravities of the materials to be separated is so small that separation by gravity alone would be too slow and incomplete to be economical. Froth flotation offers a solution to the problem and in this process the particles of materials are subjected to the physico-chemical action of a reagent in addition to that of gravity.

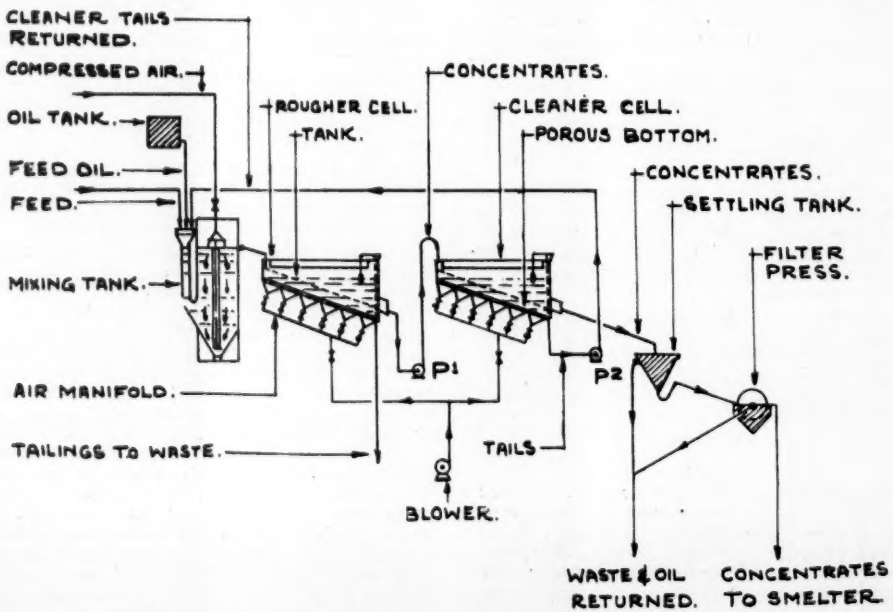
FLOTATION PROCESS

The process consists basically of adding a reagent to a prepared pulp of materials and water, and then passing air through the mixture. The sulphides are collected by adherence to the bubbles so created and, rising to the top of the separation machine in the form of a froth, are held thus until recovered by skimmers, or by flowing off the surface of the pulp. The heavier materials from which the sulphides are separated gravitate to the bottom of the machine. Most organic and inorganic components give bubble adherence and water repellency to minerals, but it is observed[2] that the most common reagents used are oils such as coal tar, creosote and pine oil, and organic frothing agents such as naphthylamine dissolved in xylidine and xanthate. When oils are employed it has been found that an acid pulp often makes possible a higher recovery of the sulphides and, with a naphthylamine and xylidine, an alkaline pulp is necessary.

A DIFFERENTIAL EFFECT

By the proper selection of reagents in the treatment of complex ores it is possible to secure a differential effect whereby a separation is made of the various sulphides. The addition of certain reagents to the pulp gives a gas-adhesive coating to one sulphide and a water-adhesive coating to the others, and so prevents the floating of all sulphides with the exception of the one required. The remainder can be recovered one at a time by the further addition of suitable reagents.

In all flotation processes it is found necessary to secure maximum bubble attachment and this can be obtained only by violently agitating the pulp and added reagent whilst a current of air is passed through the mixture. Two methods, or a combination of these two methods, are employed; these are the mechanically agitated and the pneumatic. In the former, turbulence is secured by means



Diagrammatic arrangement of Callow machine, employing compressed air at 20 lb. per sq. in.

of an impeller and the air is drawn in from an external source by means of this impeller. In the latter both the turbulent zone and aeration are provided for by low-pressure compressed air. An alternative method combines both the foregoing, in that an impeller is employed to agitate the pulp, and air is introduced, to impinge on the impeller, by means of a compressed air jet.

Agitation and aeration constitute the first stage in the process, after which separation of the bubble-attached sulphides from the remainder of the particles occurs and finally accumulation of froth on the surface of the pulp.

PNEUMATIC MACHINES

The Callow flotation machine is perhaps the best known of the pneumatic machines and in this, according to Perry, a very satisfactory recovery has been obtained when the cells are treating from 1½ to 3 tons per sq. ft. of tank area. Referring to the arrangement of this equipment, it will be seen that the reagent is added to the pulp as it enters the conditioning or mixing tank and is then agitated by compressed air at 20 lb. per sq. in. The thoroughly agitated and aerated pulp flows by gravity into the rougher cell, wherein first-stage concentration is effected. This cell consists of a tank incorporating a sloping porous base through which air at 2 lb. per sq. in. is bubbled, equal distribution and control of air over the entire area of the contained pulp being secured by means of the air manifold.

The rough concentrates from the rougher cell are either elevated by pump P_1, or flow by gravity if headroom permits, into what is known as the cleaner cell, whilst the tailings or underflow are run to waste. The cleaner cell is constructed in a manner similar to the one preceding it and the concentrates from this are passed to a settling tank, wherein the major portion of waste and oil are removed, and thence to a filter press before transportation to the smelter. Waste and oil from both settling tank and filter press are returned for reagent recovery and as the underflow of the cleaner cell usually contains too much valuable mineral to be sent to waste it is returned to the mixing tank for recycling by means of pump P_2.

The Holman-Michell table flotation process, incorporated in the flow-sheet of a tin-dressing plant, has been developed to effect separation of particles larger than those amenable to ordinary froth flotation. Successful results are claimed to be obtained with lead-zinc ores, molybdenite and stibnite, among other minerals, and installations are now dealing with pyrite and arsenopyrite from tin and tin-wolfram concentrates. In addition to metallic ores, fluorspar is being successfully treated by the process and satisfactory tests have been carried out with barytes, felspar, gypsum and mica.

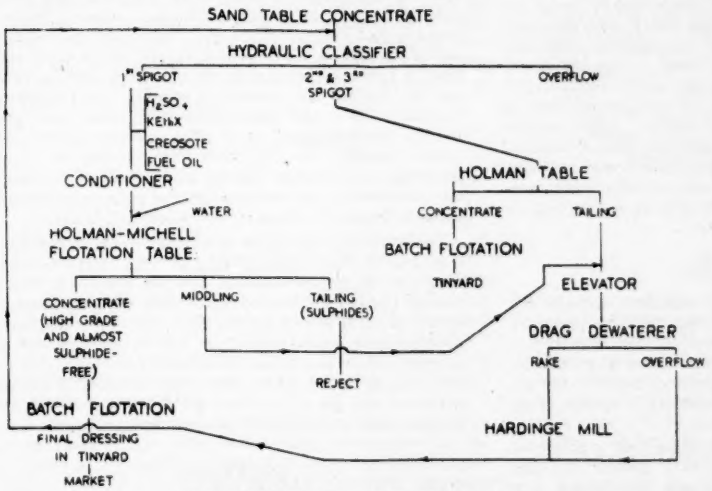
It is stated that materials as coarse as 5 or 6 mesh can be treated and, as a result, grinding costs are reduced and there is less slime loss than with processes which deal only with fine materials. Furthermore, the coarse concentrate facilitates de-watering and drying, and the larger particle size is often preferable for subsequent employment, as in the case of fluorspar for the steel industry, whilst the same features provide for lower losses in transit.

There are two operational stages in the table flotation process and these are: (1) the conditioning or mixing of the pulp with suitable reagents; and (2) treatment of the conditioned pulp on a table equipped for the purpose.

THE FIRST STAGE

The first stage follows normal froth flotation processing. Reagents are added to the de-slimed pulp, together with a suitable insoluble oil to effect the selective oiling of the particles to be separated (Perry gives 0.5 lb. of organic frothing agent per ton of solids and in some plants a small amount of pine oil is also used), and these additions are made when the pulp, containing 20 to 30 per cent moisture, enters the conditioner. This particular piece of equipment consists of a trough incorporating a horizontal shaft fitted with blades, so arranged that as the shaft revolves the blades mix and aerate the pulp whilst conveying it along the trough to the discharge end.

The pulp, after conditioning, is fed from the discharge end of the mixer on to the flotation table. As this equipment comprises a standard sand table equipped with a simple arrangement for low-pressure air supply it is of interest first briefly to consider its construction and method of operation as a concentration table. The essential design components are a deck, an underframe and a vibrator, and these are so arranged that, with the deck mounted on the underframe by 42 flexible carriers, a differential motion is imparted to the deck, in a direction of a line passing across its corners by the action of the vibrator. Correct alignment of the deck is secured by screw adjustment incorporated in the carrier brackets, and the inclination of the deck, to suit the material being handled, can be adjusted by means of a tilting device.



Holman-Michell Process in Tin Dressing Plant

The deck is practically flat, except for a shallow depression at the feed end and a gradual slope towards the concentrate end, and is surfaced with linoleum. Riffling is fitted on the surface of the linoleum, approximately parallel to the line of stroke, and the riffles are constructed of wood for the greater part of their length and are then

extended by their brass strips.

To convert these tables to satisfy the flotation process a series of jetted pipes are secured to the underframe and arranged just above the deck and at right-angles to the line of stroke. Jets of low-pressure air are directed from the pipes on to the deck and these produce small waves in the liquid film, causing the oiled particles to become suspended in the air-water interface and to be carried towards the tailings side of the table. The unoiled particles are conveyed forward along the deck by the action of the head motion and discharged at the concentrate end, whilst mixed grains and any minerals of lower specific gravity, if present, may be separated as a middling.

Through aeration in the conditioner and whilst cascading on to the table, a proportion of the pulp forms loosely-bonded agglomerates; these, being lighter, larger and more rounded, tend to stratify vertically above the unagglomerated particles and are therefore washed clear of the unoiled material. As the riffle cleats become shallower, the oiled particles are subject to the action of the air jets and are, consequently, readily floated. Actually, such agglomerated particles, or spherules, break on contact with the air, and the individual particles of oil minerals ride towards the tailing edge of the table on the surface of the water by skin flotation.

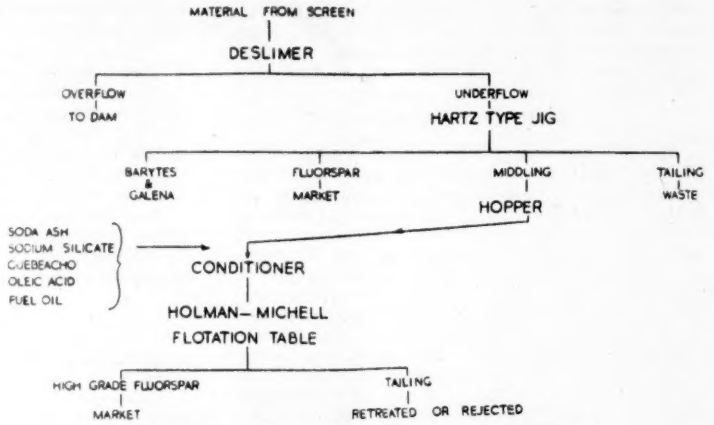
The makers state that separation is possible over a wide range of sizes—usually from a maximum of about 10 mesh (1.65 mm.) down to 100 mesh (0.147) although some material as fine as 150 mesh can be treated provided the feed is freed from near-colloidal slime. Optimum results, however, are said to be obtained usually on material coarser than 100 mesh, whilst the upper size limit is dependent on the floatability as well as on the specific gravity of the mineral to be floated. With a mineral possessing a low specific gravity, such as fluorspar, particles up to 6 mesh, Tyler (3.327 mm.) can be easily treated, and flaky minerals—such as graphite and mica—respond to treatment up to 6 or 8 mm. in size.

OTHER TYPES

Other basic air-type flotation machines include the Forrester, the Hunt and the K and B. The principle[1] employed in each of these to create the necessary turbulence is that of agitation by the formation of a cascade, the breaking up of the air itself providing aeration and the pulp cascading into the tank through the agency of an air-lift created by this air.

Referring to the K and B air-type machine, it is quoted that a turbulent zone is created in a circular chamber within which is placed an air diffuser. The diffuser is a hollow cylinder of a silica filter media sealed at the top and bottom. The rapidly rising air bubbles cause a suction on the feed inlet pipe, and the pulp is drawn into the air-lift chamber to mix with the new feed drawn through the inlet pipe and cascades over the upper hood ring into the tank. There is, therefore, an intensive agitation due to cascading.

As has already been stressed, flotation is used extensively not only in the separation of metallic ores but also in treating non-metallic minerals. A further interesting example of the latter application is evidenced[3] in the plant employed to treat phosphate at the Peace Valley and Noralyn Phosphate plants of the International Minerals and Chemical Corp., Chicago.



Section of Flow-Sheet showing application of Holman-Michell Flotation Table in a Fluospar Plant

FINAL PROCESSES

The flotation feed, being the finer of the two fractions produced by the de-sliming section, contains not only sand, in addition to phosphate, but also a small remaining quantity of clay. To deal with this a double float is used, first floating the rock away from the sand and then, through the use of a different reagent, floating the remaining sand away from the rock concentrate. In the first circuit the feed is treated with a reagent which coats and permits bubble attachment to the phosphate particles, but not to the sand. The circuit is a complete one employing flotation cells of the sub-aeration type, from which the tailings are segregated in a 30-ft. hydroseparator and passes through scavenger cells for recovery of small quantities of phosphate trapped in the bulk of the sand. At various stages hydro-separators and rake classifiers are used to dewater the feeds to the various cell banks.

The recleaned concentrate is treated to remove the residual reagent, then re-treated with an amine reagent which coats and floats the sand but not the phosphate. After passage through the final bank of amine cells, the concentrate is partially dewatered in a 30 ft. hydroseparator, then pumped to a bowl classifier on top of the concentrate shipping bins, where further dewatering takes place. Slimes are removed to the slimes pond from the various hydroseparators and the tailings from the flotation section leave the scavenger cells and flow to a tailings pond.

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2. Perry, J. H. *Chemical Engineers' Handbook* (1st Ed.), pp. 1451-1454. (McGraw-Hill Book Company Inc., New York and London.)
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Diamond Drilling Symposium in Johannesburg

By A SPECIAL CORRESPONDENT

The following is the second part of a comprehensive report on the three day symposium which opened in Johannesburg on Monday, April 21, under the auspices of the Chemical, Metallurgical and Mining Society of South Africa. More than 150 members attended, amongst them over thirty from various countries of the world. The papers presented here offer comprehensive details of the interesting subject of orientation.

Mr. R. Glossop dealt in a partly humorous way with the utilization of diamond drilling in civil engineering construction. He differentiated between the four main uses, which he enumerated as investigation, injection of cement for grouting purposes, rock excavation, and recovering test cores from concrete and other materials. He emphasized that the problem of investigation was the most important. Sight investigation sometimes proved most traecherous, as a particular example, sedimentated rock of the British Isles might have been washed away after the glacial period of a much lower sea level, forming large incisions which later were to be filled by clay.

Formations of this type could only be found by careful exploration with rock drilling, in particular diamond drilling. The practice had not only to be continued until bed rock had been reached, but it was in addition necessary to drill the bed rock itself for a depth of 25 ft. or more in order to establish certainty.

Some interesting illustrations were shown from dam sites, which portrayed large incisions which necessitated bridgement by special constructions. Therefore investigation is able to save the prohibitive costs entailed by inadequate construction. Investigation by rock drilling is also necessary when building in coal mining districts. It has been observed that on occasions the core has brought up wood.

The injection of cement to buildings which subside through earth movements owing to traffic effect is common practice. In the case of the Lincoln Cathedral it could be proven that a wing was built on Roman gravel which subsided when an arterial road with heavy traffic was opened nearby. An example of rock excavation is the work of Canadian and British tunnelling companies at Gibraltar during the war.

WIDE SCOPE OF PAPERS

In his paper on the Mount Weather experimental mine Mr. G. Agnew pointed out that this was not in fact a part of a mine, but was only an experimental station. The property was acquired in 1902 by the Department of Agriculture, and was situated 85 air miles north of Washington. It comprised 85 acres and, insofar as geological structure was concerned, consisted of hard and dense rock. In 1935/36 it was opened for mining with the author as resident engineer. A workshop and an underground core library were erected. The mine staff acts in an advisory capacity as well as carrying out experimental work.

The paper described several projects such as the testing of military explosives, with special precautions for the miners. The conclusion was that such explosives should not be used underground as they developed dangerous gases such as Co_2 and led to secondary explosions. Another problem presented was the development of suitable patterns for the blasting of cross cuts.

Mr. Agnew read in addition the paper presented by Messrs. A. E. Long and C. B. Slawson on the orientation of diamonds in drill bits. In previous papers already published, some preliminary results were given (June 1951), and recommendations on the identification of the hard vector directions were made (February, 1952). The current paper deals with the cost problem involved, as seen in the United States.

During World War II the price for boart remained constant at 2.6s. per ct., but in the post war years the price for boart increased in steps, so that at present, in the view of the authors, the substitute limit has been passed. However, by orientation according to the hard vector directions, better use can be made of the diamonds and, for example, with Congo boart equivalent results as with more perfectly crystallized stones may be obtained. The setting practice by utilization of a vacuum pencil was described in detail.

In the casual setting methods hitherto applied, the octahedron was down graded, but current study showed

(Courtesy of F. L. Christensen)

A Standard Set Bit

that this need not be the case. In the discussion, Dr. J. F. H. Custers suggested that the orientation according to the crystallographic axis as suggested may be difficult visually owing to the imperfect crystallization of the stones and that only X-ray methods could be envisaged to do this more perfectly. Yet, for instance, the magnetic or electric axes of the diamond could be utilized. He enquired further whether the authors had already considered the use of atomic energy for blasting.

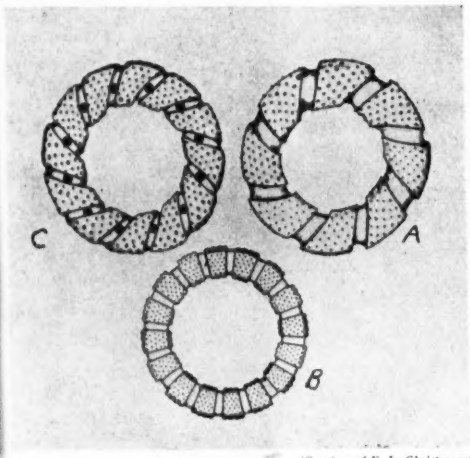
One of the best papers in the session, presented by F. L. Christensen, dealt with the manufacture of diamond drill bits in oil well drilling, and forwarded the considered views of the American diamond drill bit industry. Diamond drilling with hand set carbons was used by Stone and others in the 1890's. Hole diameters ranged from 2½ in. to 7 in. and cores from 1½ in. to 6 in. diameter, while the average depth was less than 1,500 ft., although holes of 6,000 ft. depth were known. From 1890 to 1920

a considerable number of holes were diamond drilled, but not much is known of diamond drill applications from 1920 to 1946. The reason may be the very high cost of good hand-setting carbon reaching over $150 per ct.

Further electrical logging and reflection seismograph methods enabled the geologist to predict highs and lows of key bed strata, thus reducing the need for diamond drill holes. The invention of the roller cone bit practically eliminated the use of the diamond drill bit. When during the last war the search for oil received a new impetus, the range for better equipment was again created. From its re-introduction diamond coring in Rangely was 56.5 per cent cheaper and 68.5 per cent faster than conventional coring. At present the diamond drill bit can be considered as standard for hard and tight formations. The following recommendations for the distribution of stones per sq. in. area are made.

Average size per carat		Formation Hard		Average		Soft
2	...	64	...	52	...	40
8	...	19	...	15	...	11

The average size of 2 per ct. might vary from 1-4 per ct. and was named for convenience "Congo." The average



(Courtesy of F. L. Christensen)

A. Large Waterways; B. Multiple Waterways, and C. Ports

size of 8 per ct. might vary from 5 to 12 stones and was named for convenience "Drill Boart." The harder or more tightly cemented the rock formation the more cutting points are required, and in addition the stone exposure is dependent on the drillability of the rock. In harder formations the stone should be placed deeper into the matrix, whereas in a formation with rapid penetration, greater exposure may result in better performance. The average exposure is 25 per cent of the diameter of the diamond. Having determined the proper diamond size, concentration and exposure for a particular bit, the final determination in the preparation of a mould is the distribution. The entire kerf width must be covered by a proportionate share of diamonds. No concentric circle in the face should exist which is not adequately covered with stones.

The author described a series of interesting and novel bit designs starting from a common bit design. A "tear drop" design has elongated depressions in the mould to form a backing for the diamond in the direction of rotation.

In a pyramid design each stone is set in the apex of a pyramid formed by the intersection of radial grooves, with a groove generating from the inside diameter clockwise to the outside diameter; the stones have no exposure. In another design, wedge shaped flats are formed by radial and spiral grooves with diamond only exposed on the face. In a new and promising design the diamonds are arranged in concentric rings. Reference was made to the attempts of E. P. Pfleider and A. E. Long to improve drilling performance and reduce diamond loss by correct orientation. At the present state of knowledge it is, however, queried whether the setting costs may not be unduly increased when making a 8.75 in. bit with over 4,000 stones.

The sintering method for producing drill bits was discussed in detail; this is exclusively used for petroleum drilling bits. But special techniques become necessary to develop efficient bits. One of the first attempts to prolong the life of the bit and to avoid erosion was chrome plating. Chrome, however, did not adhere closely to the diamond surface and the chrome plate was usually eroded. Therefore, a search was made for a more abrasion resistant matrix. Tungsten carbide was not considered useful but ferro-molybdenum, ferro-tungsten, tungsten, nickel, cobalt, fused tungsten, carbide bonded with tougher and more abrasion resistant binders of both ferrous and non-ferrous metals, were tested. Now fluid erosion of the matrix has only a minor influence due to these investigations.

IMPORTANCE OF WATERWAYS DESIGN

The cross-section of the crown should have preferably both an inside as well as an outside radius "bull nose" whereby the bit is well-piloted, besides being given the largest surface area for setting the stones. During later years the use of the latter type of crown has increased.

An important item was the design of the waterways. According to the author the only requirement was that sufficient fluid be circulated around each stone to remove the cuttings and dissipate the heat generated by friction. This amount, depending on bit diameter, kerf width and penetration rate, is 50 to 125 gal./min. The amount of water depended also on oil or water base fluids, mud viscosity, penetration rate, and similar considerations. If the operator circulated larger quantities than required by proper bit performance, several detrimental effects were observed: (*a*) increased fluid wash of the matrix; (*b*) bit lifted off bottom; (*c*) increased fluid wash of core; (*d*) fluid wash on the blank.

The solution was to by-pass the excess fluid by increasing the number of waterways or by discharging a portion of the fluid through posts in the face. When circulating mud fluids a large waterway proved most satisfactory Experience with air or natural gas as a drilling fluid was limited. Core barrels for the petroleum industry were mainly of the double tube swivel type, but single tube and double tube rigid barrels had been used with a varying degree of success. A number of new swivel assemblies and core lifters were described in detail. Depending on bit diameter, kerf width and drillability of the formation, the optimum drilling weight might vary from 3,000 to 30,000 lb. as indicated by weight indicators. But this was rarely the actual weight applied to the bit. After the best drilling weight had been selected, the feed must be constant or too little or too much weight, with accompanying ill effects, would be applied. In the first instance the diamonds would be sheared or the bit burnt; with too little weight the pump pressure would overcome the weight and the bit bounce on the bottom.

Thus diamond bit performance is materially improved by automatic feed devices. For a given set of conditions the optimum rotary speed is between 40 to 70 with 55 r.p.m. as a good average.

The National Industrial Safety Conference

The 1952 National Industrial Safety Conference at Scarborough attracted considerable notice. Perhaps its chief value was to show that, while British safety equipment manufacturers are able to produce effective equipment to meet the hazards of modern industry, there remains much to be done to satisfy the requirements of the mining industry.

Over 600 delegates attended the 1952 National Industrial Safety Conference held at Scarborough from May 16 to May 18. The Conference was organized by the Industrial Safety Division of the Royal Society for the Prevention of Accidents. The Conference took the form of a convention and an exhibition, which ran alternatively throughout the three days.

THE LATENT PROFITS OF SAFETY

It is now widely recognized throughout Britain, as well as in other countries of the world, that industrial safety plays a large and increasingly important part in the efficient flow of twentieth century production quotas. The old adage that "Safety Pays" is true in a two-fold realization. First, in the avoidance of lost time and wrecked equipment that automatically introduce prohibitive costs as the logical result of any industrial accident; and second, as the expenditure demanded by workman's compensation in the event of injury. In addition, humanitarian considerations demand healthy and safe workmanship. Thus expenditures spent to provide safety precautions of all types are merely an investment in the latent profits of safety. Although these profits do not appear in the balance sheets in the form of £ s. d., their value is nonetheless real. For they are the increments to profits which arise from the continued flow of production which is accomplished because of the accident that never happens.

A bitter truth is that safety engineering in the British mining industry is currently almost an untapped reserve. The mining engineer is aware of the need for it, and manufacturers conceivably are able to supply the equipment necessary for its propagation. Yet, assuming that the co-operation of mining engineer and manufacturer is all that it might be (which is debatable), there remains the problem of educating the miner to an appreciation of the need for full safety equipment and practice. If this could be achieved the present emergency can be faced with some degree of confidence.

Speakers at the convention of the Safety Conference this year were Mr. C. R. Wynne-Roberts, head of the Production Division, British Institute of Management; Mr. R. N. Le Fevre, training and education officer for the North Thames Gas Board; Mr. H. E. Phillips, safety engineer, Vauxhall Motors Ltd.; Mr. H. M. Page, refinery superintendent, National Oil Refineries Ltd.; Mr. A. H. Long, safety superintendent, National Oil Refineries Ltd., who assisted Mr. Page with his lecture; and Dr. F. C. Harper, of the Building Research Station. Mr. J. Blunt represented the National Coal Board.

DISPLAYS OF MINING SAFETY EQUIPMENT

It has been repeatedly asserted by H.M. Inspectors of Mines that the eye accidents occurring in British pits could be avoided if miners would wear safety goggles. In this connection it may be mentioned, however, that manufacturers of safety equipment have not as yet produced a completely satisfactory goggle. A non-fracturing glass is not the whole answer to the problem. Underground goggles must be easy and comfortable to wear in hot and gritty conditions, as well as being manufactured to supply full protection of the eye from all angles. Of equal importance is the essential requirement that a mine-worker's goggles cannot be allowed to mist over.

Firms displaying safety goggles at the Safety Conference included The Hadley Co. Ltd., R.F.D. Co., Wallach Bros. Ltd., J. & R. Fleming Ltd., Safety Products Ltd., and Stratford Products Safety Service Co. Ltd.

The boot is one of the essential pieces of underground equipment. Need decrees that an underground boot must be well hobnailed to prevent slipping in steep stoping areas or in winzes and raises. It should in addition be strongly formed in the instep and ankle portions to prevent the possible occurrence of minor accidents such as nail or small rock scratches or ankle twists that might be sustained during normal mining operations. Yet an operational factor of primary importance, is the need for the miner's boot to afford the wearer complete toe and instep protection.

While it is quite true that the safety shoes and boots so far developed in this country have saved the feet of miners when subjected to crushing weights far in excess of the standard 150 ft./lb. laid down by B.S.S. requirements, nevertheless, extravagant claims for the protective capacity of footwear in mines should be avoided. The 150 ft./lb. specification refers to direct blows brought to bear upon the boot, and the specification of resistance afforded by the boots to deflected blows must remain a matter of conjecture. It is equally important to recognize the contributory factors suggested by the angle of blow and the constructional nature of the falling body.

Effective display of safety goggles and face-shields by Safety Products, Ltd.

Manufacturing firms displaying safety boots at the Safety Conference included Wilkins & Denton Ltd., Briggs Industrial Footwear Ltd., Dunlop Rubber Co., S. Elkan Ltd., Ward & Charter Ltd., and Allen & Caswell Ltd.

CHEMICAL AND ENGINEERING SCIENCE AIDS SAFETY EQUIPMENT MANUFACTURE

In recent years occupational dermatitis has been increasingly considered as a brake on industrial efficiency. One of the major occupational diseases, it is regarded as a cause of absenteeism, and as a cause of lowered production and hindered recruitment. It can conceivably lead to legal proceedings, for in the majority of cases it is directly promoted by the chemical irritants handled in the course of a day's work.

Of particular interest to mine management, therefore, is the realization that Barrier creams are adaptable to use

in the mining industry. Indeed, no department of underground endeavour is far removed from the need of hand protection.

Barrier preparations were displayed at the Safety Conference by Rozalex Ltd. and Ibex Petroleum Products Ltd.

The safety tools of industry were shown by Beryllium & Copper Alloys Ltd. The consideration of safety tools is a wide one, and worthy of the mining engineer's serious attention. Not only must a tool render safe grip, but in addition a minimum of opportunity for sparking is essential to the mining industry.

George Angus & Co. Ltd. displayed a further factor of industrial safety with the firm's exhibit of protective clothing. No specific regulation can be brought to bear on *the exact boundaries of the utility of protective clothing* in industry. As its name implies, protective clothing of all types is manufactured to resist the aggression of materials from iron or rock to liquid and searing dust or acids. Protective clothing of some specific type is therefore an essential in every industry of the twentieth century.

In similar vein, the fire extinguishers shown on the stands of Antifyre Ltd. and the Pyrene Co. Ltd. are an essential unit of industrial equipment. The Antifyre Pistole is claimed to employ in one unit the three most satisfactory principles of dealing with fire. These principles embrace deoxygenation, blanketing, and beating. It is represented as dealing instantaneously and effectively with 95 per cent of fire outbreaks on initial discovery, including electrical and petrol fires, as well as gasbursts and chimney fires. It is not forwarded for use on deep seated fires.

The fire extinguisher designed for use in modern industry should possess seven main characteristics. It should be completely portable and simple in operation; and should be capable of highly efficient extinguishing powers, as well as rechargeable at the scene of operations. Finally, it should be able to deal with all types of fires, should be free from liquid corrosion, and should be reliable if left unexamined for considerable periods.

Mankind's fear of fire and darkness are probably products of contemporary periods of his mental development, hence it is perhaps just that the miners' lamps manufactured by Ceag Ltd. were on display at the conference.

LAST RESOURCE EQUIPMENT

It is a maxim of the mine safety engineer that, although every precaution be taken to ensure a non-accident return, extra effort should be put into the design and administration of rescue team equipment in the event of previous safety calculations being proved momentarily ineffective. Siebe, Gorman & Co. Ltd. showed respirator apparatus capable of being worn for long periods under the arduous conditions of sand and shot blasting operations in the finishing of steel castings. The manufacturers explain that this "Microfilter" dust respirator owes its inception to the Committee on Industrial Health of the British Steel Founders' Association, which requested the Company to supply a respirator capable of meeting the conditions described.

So far as the mining engineer is concerned, similar equipment, together with the Company's light weight "Essjee" duralumin helmets, is worthy of serious consideration for the equipment of underground rescue squads, and indeed, for underground workers generally.

In its entirety, the Safety Conference showed the need for continual activity in the cause of industrial safety precautions but unfortunately much remains to be done before the Safety industry can be said to be adequately meeting the hazards of the mining industry, both coal and metalliferous.

TECHNICAL BRIEFS

Birlec's Twenty-Five Years of Endeavour

An article in *The Mining Journal* of April 3, 1937, dealt exclusively with Birlec electric furnace manufacture in Great Britain and stressed that the advance of modern engineering skill and techniques decreed that directors and executives keep abreast with mechanical improvement. This creed is still the foundation of Birlec success to-day, as was emphasized by Mr. J. H. Crossley, sales director, when he spoke at the silver jubilee luncheon held to commemorate the first 25 years of the company's endeavour.

Mr. Crossley pointed out that Birlec claimed to be the largest organization of its kind in the world making furnaces and allied equipment only. He underlined the positive efforts made by all departments in the company's production.

Formerly a department of Henry Wiggin & Co., Ltd., Birlec stands to-day with its parent firm as a sister company within the Mond Nickel Co., Ltd. and the International Nickel Co. of Canada organizations. Birlec began on a firm foundation, as its leader originally was Mr. A. Glynne Lobley, metallurgist and scientist of brilliant technical standing.

During the years, the scope of Birlec production had widened. The company now manufactured gas-fired equipment which, although using a large amount of nickel alloys, did not depend on their resistance qualities for the generation of heat. And in this connection, it might be claimed that the successful development of electric furnaces had stimulated gas furnace designers to greater efforts. In the main, Birlec had followed the best practices of American design. In collaboration with Ajax-Northrup, high frequency induction units for steel as well as low frequency induction units for aluminium and other non-ferrous alloys had been built up.

In general, the company had constructed and was able to construct, a type of electric furnace for every heat treatment and melting process. A further manufacturing interest were the Birlec Lectrodryers, non-chemical moisture adsorbers depending on the properties of activated alumina. Although this type of equipment is currently applied specially to the chemical and general engineering industries, Mr. Crossley pointed out that it was interesting to record that the dryers originated as a metallurgical application.

In more technical vein, it is generally apparent that electric furnaces are increasing in importance, especially in those countries utilizing relatively cheap hydro-electric power. In a paper presented at the Fourth Empire Mining and Metallurgical Congress, M. Cook, director of the Metals Division, Imperial Chemical Industries Ltd., pointed out that insofar as melting techniques are concerned, new types of furnaces, particularly electric, have been employed to an increasing extent throughout the industry; that is, from the primary production of copper shapes on the one hand to small casting shops and foundries on the other. Low frequency induction furnaces are now a characteristic feature of large manufacturing units in the wrought section of the industry and, in line with the tendency throughout the industry to increase the size of plant items, the earlier versions, with a capacity of 600 lb. of cast metal and a rating of 75 kW., are being added to or replaced by furnaces of up to 2,500 lb. capacity rated at 300 kW.

The many advances in melting methods, and the control of these methods, include foundry techniques. A marked improvement in the quality of bronzes of various types and of other alloys, has followed the adaption of melting procedures based on the results of several important studies carried out on metal melting.

Crushing and Fragmentation of Rocks

The influence of teeth on the jaws of crushers has been discussed by A. Joisel (*Ann. Inst. tech. Batim. Trav. publ.* 1950, New Series No. 122). According to the author toothed jaws improve neither the size nor shape of the product. Such crushers require as much power as those with plain jaws for only a slightly increased output of the order of 10 per cent or less. Wear is considerably increased. Under the same experimental conditions, the product obtained from gyratory crushers is almost identical with that obtained from toothed crushers.

METALS, MINERALS AND ALLOYS

A feeling of suspense seems to dominate the metal markets as prices decline in various directions. Decontrols are progressive in the United States pointing to supplies being easier as does the relaxing of credit systems. The progress of the dispute in the American steel industry appears to outline the platform of the Democrats for the Presidential Election as it is being developed by President Truman for the benefit of his successor. The C.I.O. has claimed that its support was largely instrumental in securing his election in 1948 and recent speeches like those of the United States Secretary of Labour, Mr. Tobin, suggest that the obligation is acknowledged by some members of the democratic administration. Mr. Tobin also told a sub-committee of the Senate that Congress should pass legislation giving President Truman power to seize defence industries should the Supreme Court rule that his recent action was illegal. The Supreme Court deferred giving a decision for a week on Monday last, and Mr. Justice Jackson has said that he would oppose giving it until the opinion had been written. June 2 is now mentioned as the earliest date on which a judgement may be expected.

The settlement of the U.S. railway strike appears to be a good omen for the composition of difficulties in other industrial fields.

COPPER.—The Copper Institute figures for April showed total crude production 89,423 s.tons (March 87,110); refined totalled 98,402 s.tons (94,563); and deliveries (including material ex-stockpile) 107,355 s.tons (112,625). Stocks increased to 61,223 s.tons on April 30 (58,487). Outside the United States the production of crude is given as 115,848 s.tons (118,985); refined totalled 107,237 s.tons (98,767); deliveries were 92,391 s.tons (77,427); while stocks of refined totalled 166,043 s.tons (163,220). U.S. imports of copper from all sources including scrap in the first quarter of the year totalled 131,447 s.tons compared with 121,738 s.tons in the same period of 1951.

Two personal representatives of President Truman are expected to arrive in Santiago this week to discuss the situation arising from the Chilean denunciation at the beginning of the month of their one-year old agreement with the American copper companies. According to the Minister of Economy, Senor Pablo Larrain, the Central Bank is now handling all foreign sales of Chilean copper, and he indicated that virtually all output had been placed in international markets at "convenient" prices. The delay in procuring Chilean supplies seems to be causing considerable anxiety in the United States, where, failing a further draught on the stockpile, an extremely critical supply situation is expected to arise in June. In the event of an agreement being reached to satisfy Chilean ideas, the question of whether the increased price would be made available for all other foreign copper (now at 27½c.) and of any corresponding advance in the domestic price of 24½c., will arise. The Copper-Lead-Zinc Committee of the International Materials Conference is now compiling its production requirements for the last half of 1952 and the resulting recommendations will then follow; consideration of these may be expected to start next week.

According to a Reuter report the Soviet production of copper last year totalled 291,000 tonnes.

Replying to a question as to supplies of beryllium-copper to manufacturers in this country, last week, Mr. H. Strauss said beryllium copper is imported on private account, and the United States is the only source of supply of the master alloy at the present time. U.K. imports so far this year were about 40,000 lb. Importers have for some time been finding considerable difficulty in obtaining supplies but the position has become rather more encouraging. However, beryllium copper is likely to remain scarce for the present, and it was impossible to say when the outstanding demand would become less.

LEAD.—Following the cut in the price of lead in the U.S. last week, inventory controls on lead have been removed. The transfer to the United States of 53,000 tons from the surplus stock accumulated by the British Government was stated recently by Mr. Fletcher of the St. Joseph Lead Co. to have changed the picture confronting domestic producers. It would be interesting to know how the price at which the lead was sold compares with what was paid by the British Government for its original acquisition. The urgent need to acquire dollars might perhaps be advanced in justification should there be any loss on the transactions.

The Ministry of Materials has reduced the price of lead by £2 per ton to £129, from yesterday, but this figure remains well above the current European price. Mr. J. McEwen, Australian Minister for Commerce, has reported the existence of a substantial surplus in Australia of lead and zinc available for export.

TIN.—The completion by the British Government of the 20,000 tons supply contract to the United States seems to be regarded there as a possible critical factor in future prices. It is expected to be completed long in advance of the time limit; according to one estimate within 30 days from mid-May. U.K. buying of tin in the Straits to acquire the necessary supply is generally considered one of the factors which has kept up the quotation. *The American Metal Market* reports that large tonnages of tin have been arriving in New York and are being stored in warehouse, and not added to stockpile. Mr. Larson, head of the G.S.A., has expressed the opinion that the government would be glad to retire from its position as sole buying and selling medium for tin and to hand over operations to industry, as soon as possible. He stressed also that world production was exceeding consumption.

April production of tin in Malaya is reported as 4,669 tons compared with 4,736 tons in March. Speaking at the Straits Trading Company's meeting in Singapore, the Chairman, Mr. Fergusson, is reported as saying that production from Trengganu and Kelantan as well as in Johore has been dropping off owing to government restrictions on working for security reasons. Generally, there had been a significant decline in the output from Chinese controlled mines since 1950 which was continuing, and generally small-scale mining must be affected, until security returns. There was also a reduction last year of about 3 per cent in concentrates available for smelting owing to smaller receipts from sources outside Malaya, due to a desire to realize in currencies other than sterling.

In Bolivia, President Estensoro has issued a decree setting up a commission to study the bases and conditions for the nationalization of the Patiño, Aramayo and Hochschild groups of mines. The commission is to study the bases and conditions for nationalization through expropriation of the mines of these groups and will consist of a representative of the Ministry of Mines and Petroleum, now controlled by Señor Lachin; representatives of the Ministries of Economy and of Finance; the Director General of Mining; a representative of the Banco Minero; a representative of the Miners' Union together with a mining engineer, a lawyer and financial auditor nominated by the President. The commission is to name the technical and administrative personnel needed to conduct the hearings and obtain from public and private sources the data required to accomplish its task. The commission will also draft a complete plan for the expropriation of the mines concerned and must submit its report to the government within a maximum of 120 days. The preamble to the decree is highly critical of the activities of these groups in the past.

Renewal of discussions between the government of the U.S.A. and Bolivia are still awaiting formal recognition of the new administration in La Paz.

Shipments of Bolivian concentrates to the U.K. continue at a high rate, and constitute practically the whole of the receipts here in April. U.K. imports for the first four months totalled 13,062 tons compared with 7,241 tons in the like period of last year.

The future of the Texas smelter remains uncertain. Indonesian and Belgian concentrates should begin to arrive by the end of the month and should obviate any complete shut down, but Bolivian concentrates should be exhausted by then, leaving only slimes to handle.

The N.P.A. has increased the amount of tin cans available to packers, the demand from whom has been declining for several months, and has increased the second quarter export quota to 125,000 tons.

ZINC.—The Ministry of Materials made a heavy cut in the U.K. zinc price yesterday when it was reduced by £24 to £166 per ton, the first change since September, 1949. However, the price is still very high, as compared with Continental dealings reported around £135. It is doubtful whether the present cut in U.K. prices will prove sufficient to induce consumers to abandon their "wait and see" policy.

On Friday of last week the Administrator of the N.P.A., Mr. Fowler, announced the removal of allocations and use of zinc. Inventory control would continue but with an extension of the stock period to 60 days. He estimated that the U.S. supply of slab zinc this year would be around 1,079,000 s.tons with consumption estimated at some 933,000 s.tons. Resulting from this lifting of restrictions, improved enquiries for Prime Western for June shipments are reported.

ANTIMONY.—The National Lead Co. has reduced its price for bulk sale in carload lots from 44c. to 39c. per lb. ex works, Laredo, owing to reduced demand and lower quotations abroad. English price is however unchanged.

ASBESTOS.—The monthly report of the Philadelphian organ *Asbestos*, refers to the influence of the steel dispute on trade generally, but believes that the outcome is bound to have a more or less inflationary effect. Demand for raw asbestos remains at capacity levels for practically all grades except those principally dependent on the building materials industry. There is no slackening in the demand for asbestos textiles, with plants likely to continue at full capacity for the rest of the year; 95-100 per cent pure asbestos yarns and cloth are in particular demand from Europe with a backlog of some three to four months. While replacements of asbestos brake linings have been slightly off, 1952 is expected to top all previous record sales. The market at present favours buyers.

The London Metal Market

(From Our Metal Exchange Correspondent)

At the end of last week the British tin smelters conveyed to the Committee of the London Metal Exchange their intention to re-enter the export market and that they were therefore withdrawing from the voluntary embargo to which they had agreed in conjunction with members of the Exchange. It is understood that the members are continuing the embargo but that the position will be watched closely. In spite of the certainty that some English tin will continue to flow to the market, the first result was that the undertone strengthened owing to an increased backwardation, and the rise was assisted by advances in the Singapore price, but by the middle of the week a downward tendency had again developed although the increased backwardation remained. Business in general has remained at a fairly low ebb except that there has been persistent merchant demand from the Continent.

The copper market remains featureless, whilst the weakness in the zinc price continues with the sterling price on the Continent now being around £135 per ton f.o.b. In the States refined zinc is being offered at over 1c. below the E. & M.J. quotation for ordinary grades without finding a buyer. The lead market appears to be steadier as customs smelters in America appear willing to take in material on basis of the present quotation at 15c. per lb., and this is reflected in a steady price in Europe of £105/£110 per ton, c.i.f.

On Thursday the official close on the tin market was: Settlement price £954, Cash Buyers £954, Sellers £955. Three months' Buyers £947, Sellers £947 10s. In the afternoon the market was steadier. Turnover for the day was 130 tons. Approximate turnover for the week was 650 tons.

The Eastern price on Thursday morning was equivalent to £969 2s. 6d. per ton, c.i.f. Europe.

Iron and Steel

The performance of the British steel industry is still disappointing. Production fell last year to 15,600,000 tons compared with a peak output of 16,300,000 tons in 1950, and at the beginning of the current year, it was hoped to restore the output to an annual rate of 16,000,000 tons.

The attainment of this target has become doubtful, to say the least. In the first four months of this year, the steel output has been well below the figures for the corresponding period of 1951, and the leeway is not likely to be made good in the next three months when production is invariably affected by the workers' annual holidays with pay.

This decline in productivity is all the more disappointing, since the steel famine is everywhere acute. More than three-quarters of the promised 1,000,000 tons of American steel has yet to be shipped and we shall need every ton to keep the steel using industries going until the end of the year.

Prospects of a bigger intake of steel from Western Europe are somewhat brighter. Price cutting by Continental producers suggests that they are in need of orders to keep their plants fully employed, and there is no doubt that the import restrictions which have recently been imposed by Commonwealth and foreign governments are directly responsible for the shrinkage in the inquiries and orders from overseas. This may only be a temporary phase. The need for steel still continues, but ways and means of surmounting the newly erected barriers to international trade have yet to be evolved.

Happily the British steel industry is sustained by an overwhelming home demand, and the disposal of maximum outputs presents no immediate difficulties. Deliveries in fact are in arrears, and may be slowed down still further by the interruption of the Whitsuntide holidays.

One bright spot is the steady rise in pig iron production. The current rate of production is nearly 1,000,000 tons per annum better than last year, but this is offset by the continued shrinkage in scrap supplies and steel workers are consequently unable to re-start any of the steel furnaces which are idle through lack of material.

MAY 22 PRICES

COPPER

Electrolytic	£231 0 0 d/d

TIN

(See our London Metal Exchange report for Thursday's prices)

LEAD

Soft foreign, duty paid	£129 0 0 d/d
Soft empire	£129 0 0 d/d
English lead	£130 10 0 nom.

ZINC

G.O.B. spelter, foreign, duty paid ...	£166 0 0 d/d
G.O.B. spelter, domestic...	£166 0 0 d/d
Electrolytic and refined zinc	£170 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over	£270 per ton
Crude (70%)	£240 per ton
Ore (60% basis)	32s. 6d. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£454 per ton

OTHER METALS

Aluminium, £154 per ton.	Palladium, £8 10s. oz.
Bismuth, 25s. lb.	Platinum (scrap), £33.
Cadmium, 18s. 3d. lb.	Platinum, £27/33 5s. nom.
Chromium, 6s. 5d. lb.	Rhodium, £45 oz.
Cobalt, 20s. lb.	Ruthenium, £30 oz.
Gold, 248s. f.oz.	Quicksilver, £73 ex-warehouse.
Iridium, £65 oz. nom.	Selenium, 25s. nom. per lb.
Magnesium, 2s. 10½d. lb.	Silver (bar), 73½d. f.oz. spot and forward.
Osmiridium, £35 oz. nom.	
Osmium, £70 oz. nom.	Tellurium, 18s./19s. lb.

ORES, ALLOYS, ETC.

Bismuth	30% 7s. 9d. lb. c.i.f. 20% 5s. 6d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£13 per ton c.i.f.
" " (concentrates)	£13 per ton c.i.f.
" " Refractory	£12 12s. per ton c.i.f.
Baluchistan Metallurgical ...	£14 16s. per ton c.i.f.
Magnesite, ground calcined ...	£26 - £27 d/d
Magnesite, Raw	£10 - £11 d/d
Molybdenite (85% basis) ...	103s. 1½d. per unit c.i.f.
Wolfram (65%), U.K. ...	485s. nom. c.i.f.
Tungsten Metal Powder (for steel manufacture) ...	35s. nom. per lb. (home)
Ferro-tungsten	33s. nom. per lb. (home)
Carbide, 4-cwt. lots	£30 3s. 9d. d/d per ton
Ferro-manganese, home ...	£43 15s. 2d. per ton
Brass Wire	2s. 8¼d. per lb. basis.
Brass Tubes, solid drawn ...	2s. 1½d. per lb. basis.

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Markets generally had a dull week and prices drifted downwards. Investors were undoubtedly uneasy over the trade recession and falling commodity prices. Gilt-edged were no exception and there were vague rumours of a further increase in the bank rate. The Distillers' issue was one of the few live spots. It was heavily oversubscribed and started off well at a premium of over 60 per cent; later this fell to under 5 per cent. The Chancellor's amendments to E.P.L. were published. Details are complicated and outside the scope of this article but, in brief, companies operating overseas have had their liability limited to 10 per cent of their profits and tin and rubber companies operating in Malaya have received special concessions to enable them to include the year 1950 in their basis for computation. The tax is very unpopular in business circles and has been severely criticized in Parliament.

Kaffirs were idle and unsettled. A good feature was the E.R.K.1 borehole announcement by Freddies. This intersected a conglomerate band at a depth of 4,949 ft. assaying 22.72 dwt. over a width of 44.25 in., equivalent to 1,005.4 in.-dwt. At a higher level, another band was intersected giving a value of 169.6 in.-dwt. The borehole is situated north-west of Odendaalsrus. Freddies and Freddies North shares improved sharply on the news. The political crisis in the Union and the news that 40 per cent of the Anglo American Corporation new issue had been left with the underwriters acted as a counterpoise. The shares were at one time under £6 but closed firmer at £6 1/16th. Switching from other Rand finance houses was reported. Johnnies were a particularly weak spot on reconsideration of the quarterly figures which display the difficulties that comparatively low grade mines are encountering to-day.

Copper shares were better. There was some natural reaction after recent heavy selling and the end of the general strike of African railway workers in Northern Rhodesia helped the market. Mazapil Copper announced that negotiations for the purchase of the company's assets had been broken off. At one time recently the shares reached 44s. but finished the period at 30s. 6d. in a rather nominal market.

The lead/zinc section was again down. Trading in lead futures will be resumed on May 26 in the United States. The statistical position of the metal is still shaky. There is a substantial exportable surplus available in Australia. Silver, which is produced by many companies in this group, also fell and this is attributed to slackening consumer demand for plated tableware. To-day, few countries use this metal for monetary purposes. Rhodesian Broken Hill exceptionally hardened on the termination of the railway strike mentioned above. Last week the final dividend announcement of 1s. 6d. a share made to New Broken Hill was inadvertently attributed by this column to North Broken Hill.

Eastern tin issues were mainly marked better at the end of the week following the E.P.L. proposals for Malayan producers. Few buyers were reported and the improvement was almost entirely technical. The price of the metal still remains remarkably steady.

West Africans eased following the news of the wage increases mentioned last week. It is impossible at this juncture to assess how the individual mines will be affected. In some quarters it is thought that much of the increase will be absorbed by recent taxation changes. At any rate, investors are clearly not taking a very hopeful view of the immediate prospects in this section.

Diamond shares hardened after their recent reaction. Some French support was reported from the market.

Dollar issues were idle and mainly down following one of Wall Street's most idle periods for a long time past. The recent strike of oil workers in the United States has ended and the men are gradually going back to work as new wage contracts are settled. British oil shares were patchy, but the increased dividend by Shell Transport and Trading, bringing the total distribution for the year to 15 per cent tax free cheered the market. This was up to anticipations.

FINANCE	Price May 21	+ or − on week
African & European	2⅜	−¼
Anglo American Corpn.	6⅛	−⅛
Anglo-French	19/6	
Anglo Transvaal Consol.	28/9	
Camp Bird	10/6	−4½d
Central Mining (£1 shrs.)	35/-	−7½d
Consolidated Goldfields	44/4½	−2/6
Consol. Mines Selection	25/-	−1/10½
East Rand Consols	3/1½	−1½d
General Mining	4⅞	−⅛
H.E. Prop.	31/10½	
Henderson's Transvaal	10/6	−6d
Johnnies	2⅛	−¼
Rand Mines	4½	
Rand Selection	36/10½	−1/10½
Union Corporation	8⅛	+⅛
Vereeniging Estates	4½	−¼
Writs	30/-	−7½d
West Wits	44/4½	−1½d
RAND GOLD		
Blyvoors	40/6	
Brakpan	17/9	−4½d
City Deep	30/-	−3/9
Consol. Main Reef	31/3	−2/6
Crown	42/6	−3/9
Daggas	3½	
Dominion Reefs	1/10½	−1½d
Doornfontein	24/-	+3d
Durban Deep	3⅛	−¼
E. Daggas	20/-	−1/3
E. Geduld ... (4/- units)	41/10½	−7½d
E. Rand Props.	3⅜	+⅛
Geduld	6⅜	+⅛
Grootvlei	33/3	−3d
Libanon	13/3	
Luipaards Vlei	18/-	−3d
Marievale	21/9	+6d
Modderfontein B.	5/6	
Modderfontein East	27/6	
New Kleinfontein	30/-	−7½d
New Pioneer	13/6	−6d
Randfontein	19/3	+3d
Robinson Deep	11/-	−9d
Rose Deep	27/6	
Simmer & Jack	6/-	−3d
Springs	7/10½	−1½d
Sub Nigel	2⅛	
Van Dyk	11/-	−3d
Venterspost	21/6	
Vlakfontein	17/3	
Vogelstruisbult	26/9	+1/-
West Driefontein	6⅜	−⅛
W. Rand Consolidated	48/9	
Western Reefs	42/6	+7½d
O.F.S		
Alpha F.S.A.	6/3	
Blinkpoort	16/3	−7½d
Central Mining F.S.	3/10½	−1½d
Freddies	8/6	+1/3
Freddies N.	7/-	+9d
Freddies S.	8/1½	−1½d
Geduld	2⅜	−¼
Geoffries	17/9	+3d
Harmony	19/3	−1½d
Lydenburg Estates	10/3	
Middle Wits	16/-	+4½d
Ofsits	39/4½	−7½d
President Brand	18/-	−3d
President Steyn	18/-	−3d
St. Helena	17/-	−3d
U.F.S.C. & G.	7/3	−3d
Virginia Deb.	70	−3
Virginia Ord.	11/3	−4½d
Welkom	29/4½	−7½d
Western Holdings (New)	3½	
WEST AFRICAN GOLD		
Amalgamated Banket	1/4½	−1½d
Ariston	5/6	−1½d
Ashanti	18/6	−9d
Bibiani	6/9	−3d
Bremang	2/6	
G.C. Main Reef	3/-	−1½d
G.C. Selection Trust	6/4½	−1½d
Konongo	2/3	
Kwahu	3/3	−3d
London & African Mng.	1/3	−1½d
Lyndhurst Deep	1/1½	−1½d
Marlu	1/4½	
Panwa	5d	
Taquah & Abosso	4/-	
AUSTRALIAN GOLD		
Boulder Perseverance	2/3	
Gold Mines of Kalgoorlie	9/-	−9d
Great Boulder Prop.	5/3	−3d
Great Western Consol.	6/10½	
Lake View and Star	15/3	−6d
Mount Morgan	16/-	
North Kalgurli	12/9	−3d
Paringa	7d	+1d
Sons of Gwalia	9/4½	−7½d
South Kalgurli	8/7½	+3d
Western Mining	7/-	−3d
Wiluna	6/-	+4½d
MISCELLANEOUS GOLD		
Cam and Motor	39/4½	
Champion Reef	7/-	
Falcon Mines	7/10½	
Globe & Phoenix	23/9	−1/6
MISCELLANEOUS GOLD (contd.)		
G.F. Rhodesian	6/1½	−1½d
London & Rhodesian	4/6	−3d
Motapa	1/7½	
Mysore	4/-	
New Guinea	1/3	
Nundydroog	5/6	+3d
Ooregum	2/9	
Oroville	1/-	
St. John d'El Rey	25/-xd	−1/-
Zams	37/3	+1/6
DIAMONDS		
Anglo American Inv.	4⅛	
Casts	29/9	+1/6
Cons. Diam. of S.W.A.	3½	
De Beers Defd. Bearer	63/6	+2/6
De Beers Pfd. Bearer	14½	+¼
COPPER		
Chartered	52/3	+3d
Indian Copper	3/6	−1½d
Messina	3⅜	+⅛
Nchanga	6⅜	+⅛
Rhod. Anglo-American	53/9	+1/9
Rhodesian Selection	14/9xd	+9d
Rhokana	19½	+½
Rio Tinto	20½	+½
Roan Antelope	12/1½xd	+1/1½
Selection Trust	38/9	
Tanks	57/9	+9d
Tharsis Sulphur Br.	40/-	−1/3
TIN (Eastern)		
Anglo-Burma	2/9	
Ayer Hitam	23/6	−6d
Bangrin	8/1½	+4½d
Gopeng	10/9	+1½d
Hongkong	6/6	−9d
Ipoh	21/6	+3d
Kamunting	10/7½	+3d
Kepong Dredging	7/3	+3d
Kinta Tin Mines	14/-	−3d
Kramat Pulai	4/7½	−3d
Malayan Dredging	22/9	−3d
Pahang	14/9	+6d
Pengkalen	8/3	−3d
Petaling	13/9	+6d
Rambutan	12/6	
Siamese Tin	20/9	−3d
Southern Kinta	14/-	−6d
S. Malayan	23/9	−3d
S. Tronoh	16/3	
Sungei Kinta	17/6	
Tekka Taiping	8/-	−1½d
Tronoh	22/9	−1/6
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	8/9	−1½d
Beralt Tin	20/9xd	+9d
Bisichi	3/7½	+3d
British Tin Inv.	15/-	−7½d
Ex-Lands Nigeria	4/6	−1½d
Geevor Tin	12/-	−3d
Gold & Base Metal	3/3	
Jantar Nigeria	5/7½	+4½d
Jos Tin Area	10/6	−3d
Kaduna Prospectors	4/-	
Kaduna Syndicate	5/-	−3d
London Tin	5/4½	
Ribon Valley	1/-	
United Tin	2/1½	
SILVER, LEAD, ZINC		
Broken Hill South	41/3	−1/3
Burma Mines (3/6 sh.)	1/7½	−1½d
Consol. Zinc	23/3xd	−9d
Lake George	13/9	−6d
Mount Isa	31/3	−2/6
New Broken Hill	23/3xd	−3d
North Broken Hill	54/4½	−3/1½
Rhodesian Broken Hill	15/1½	+10½d
San Francisco Mines	30/9	−3d
Trepca	3/6	+1½d
MISCELLANEOUS		
BASE METALS & COALS		
Amal. Collieries of S.A.	44/4½	
Associated Manganese	40/-	+1/3
Chinese Engineering	3/6	−6d
C.P. Manganese	44/-xd	−8/4½
Natal Navigation	3⅜	+⅛
Wankie	15/-	−3d
Witbank Colliery	2½	
CANADIAN MINES		
Dome	$35	+$1
Hudson Bay Mining	$86	−$2
International Nickel	$76½	−$1⅛
Mining Corpn. of Canada	£5⅛xd	+£⅛
Noranda	$139	−$2
Quemont	£7⅛	
OIL		
Anglo-Iranian	5⅞	+⅛
Apex	41/10½	−7½d
Attock	21/10½	−7½d
Burmah	60/9	+1/3
Canadian Eagle Bearer	33/6	−9d
Mexican Eagle	22/6	
Shell	4⅞	+⅛
Trinidad Leasehold	30/-	−9d
T.P.D.	28/10½	−7½d
Ultramar	31/6	+1/9

COMPANY NEWS AND VIEWS

General Mining and Finance Make Most of Share Dealings

That General Mining & Finance Corporation during 1951 was able to expand its net profit, after providing £13,000 for taxation to £713,532 against £513,000 must be regarded as wholly satisfactory. Market conditions were not, generally speaking, favourable during 1951 for profitable sharedealing, yet the directors in their report state that the increased profit was due to an improvement in sharedealing profits and also to the inclusion of revenue for technical services rendered on abnormal capital expenditure incurred chiefly by West Rand Consolidated.

This non-recurring capital expenditure refers to the construction of an extended reduction plant and the uranium recovery plant at the West Rand Consolidated Mines. Thus it may be difficult for General Mining to maintain its revenue in the current year at the level achieved during the year under review unless, of course, the mining markets over the coming year recover sharply from their present inactivity.

The year's dividend was again maintained at 25 per cent on the £1,677,286 issued capital in shares of £1 each, which absorbed £419,321. Investment reserve was appreciably strengthened by the allocation of £215,992, making a total in that account to £450,000. An amount of £20,000 (same) was written off land, buildings and mining properties, £25,000 (same) was transferred to exploration reserve and £13,000 (nil) required to meet taxation liabilities. The balance carried forward at the end of 1951 was £166,714 compared with £147,680 in 1950.

Consolidated Murchison, 1951—An Abnormal Year

The big profit expansion achieved during the year 1951 by Consolidated Murchison (Transvaal) Goldfields and Development as compared with 1950 was due to the exceptional demands for antimony both in America and the U.K. for stockpiling for strategic purposes and to the high price for antimony prevailing for the greater part of the year.

Year to Dec. 31	*Antimony Sales (conc.)*	*Gold Sales*	*Working Costs*	*Tax*	*Net Profit*	*Dividends*
	£	£	£	£	£	%
1950	840,172	137,391*	422,861	144,050	414,891	140
1951	3,017,107	127,860†	496,780	773,500	1,885,551	800

*Includes £60 received from sale of silver.

†Includes £77 received from sale of silver.

Behind the excellent results achieved during the year was the large increase in the production of antimony concentrates and cobbed ore to 27,503 s.tons compared with 14,545 s.tons in 1950, and the recovery of 9,834 f.oz. gold compared with 10,905 f.oz. gold. In fact, the vast improvement in antimony production figures enabled the company to produce concentrates and cobbed ore in excess of market demands, and at the year-end stocks of ore and concentrates amounted to 3,435 s.tons.

However, the outlook for the current year is not altogether bright. The price of antimony, which for approximately eight months of 1951 stood as high as £390 per l.ton began to drift downwards from the middle of November of last year and currently its price is being quoted at £270 per ton. Moreover, the rate of tax payable by base metal mines was increased from 5s. to 5s. 6d. in the pound in 1951 and has been further raised to 6s. in the pound in the current year, an increase which is estimated will cost the company an additional £64,400. These adverse features affecting price and profits also extend to production, and during the first three months of the current year the production of 6,131 s.tons of concentrates and cobbed ore shows a decrease of 1,141 s.tons when compared with the December quarter of 1951 and reflects a diminution of orders placed for execution in 1952.

The chairman, Mr. S. G. Menell, in his statement accompanying the report and accounts sums up the present uncertain position with his concluding remarks that "while it is not possible at this stage to forecast the extent of the sales which will be effected this year, it must be expected that there will be a material reduction on the figure for 1951," which year he added was one in which the extent of the demand and prices obtained were abnormal.

South Crofty's Wolfram Contract

From the shareholders' point of view the outstanding misfortune which befell South Crofty during 1951 was that during the first five months of the year some of the company's best tin-bearing ground was under water when tin-metal reached its record price of nearly £1,620 per ton and did not fall below £1,000 per ton until the middle of June.

The flooding of the mine was responsible for the reduction in the output of tin from 479 tons to 303 tons and this, together with the added cost of the emergency pumps would have prevented any distribution being paid for the year, but for the extremely high price secured for the lessened output of wolfram at Castle-an-Dinas which enabled South Crofty's subsidiary, Great Western Ores, to pay a dividend amounting to £15,000 gross and thus materially assist the parent company's financial results.

Revenue from the sales of wolfram realized £10,884 which compares with a mere £820 in the previous year, while the sale of tin realized £222,120 against £262,166. These were the two chief items comprising revenue from the sale of the company's products amounting to £234,599 (£265,175) which figure, was swollen by the addition of £15,000 received from Great Western Ores and income from interest, etc., to £251,179 which was not far short of the previous year's figure of £266,345. However, mining expenditure advanced by some £13,000 to £230,594 and after providing for all expenses including £3,072 (£2,806) for depreciation, profit before tax amounted to £13,189 compared with £42,925 previously. Taxation was approximately £15,000 lighter at £7,339 and the dividend payment of 5 per cent, the first shareholders received since 1945 when a similar amount was paid, absorbed a net amount of £3,071, leaving a balance to be carried forward at the end of 1951 of £10,681 compared with £7,320 brought in.

While it is doubtful whether South Crofty can obtain as high a price for its products as it did in 1951, operating results during the current year point to an improvement in production and for the first four months of the current year the tin output amounted to 137 tons against 85 tons. Taxation is, nevertheless, liable to be much heavier unless Mr. Butler can be persuaded to make some last minute changes in the standard years as South Crofty's profits during the three base years 1947/48/49, were negligible.

On the other hand the labour situation is looking better. The experiment of using Poles in the mines has proved successful and there are rumours that some Italian miners from the coal mines may be coming to Cornwall. But perhaps the most encouraging news for the company and for shareholders was the statement by Mr. Harry Rich, the chairman, that the company has obtained a three year contract with the Ministry for wolfram at the market price subject to a minimum price of 285s. per unit. Currently the price per unit for wolfram is 485s. per unit.

Mining Year Book 1952

Indispensable is the word which most aptly describes the *Mining Year Book* which is compiled each year by Walter E. Skinner and published by Walter E. Skinner, 20, Copthall Avenue, London, E.C.2 and the Financial Times, 72, Coleman Street, E.C.2.

The 1952 edition, the 66th annual issue, has just been published, giving complete and up-to-date particulars of nearly 1,000 mining companies operating in all parts of the world, together with the names and addresses of over 1,000 mining engineers and mine managers and the companies in the book with which they are connected.

The *Mining Year Book* has long been regarded as a standard reference work for all those whose work brings them into contact with the various mining companies, either registered in the U.K. or in which the U.K. is financially interested. It does not, therefore, need any introduction and at the price of 30s. net, or 31s. 6d., post free, inland and abroad, the book yields a high return on investment.

B.I.C.C. Continues to Forge Ahead

Trading profit for 1951 of British Insulated Callender's Cables was £4,585,668, an increase of £1,352,629 over the previous year's figure. The better results attracted higher tax liabilities, which increased by £643,244 to £2,707,881, and the net profit for the year figured at £2,081,318 compared with £1,644,168.

The Chairman, Sir Alexander Roger, in his statement accompanying the report and accounts said that in spite of shortages of vital materials, productivity had increased overall by 5 per cent compared with the previous year, and for the December quarter of 1951 was 15 per cent above the 1950 level. Their report, which is attractively presented, containing several illustrations showing the diverse activities of the group briefly reviews the work of each division of the company. Although it is normally impossible to give total mileages of the various types of cable manufactured yearly the chairman mentioned the impressive figure of over 8,000,000 miles of enamelled wire produced by the telecommunications division in 1951.

Direct exports at £17,000,000, were slightly lower than the previous year due to the shortage of steel and the prohibition of exports of copper in certain forms.

Some of the more interesting orders of the year were referred to in the report, including the completion of the first section of the new 275,000-volt Super-Grid planned by the British Electricity Authority to reinforce the existing 132,000 volt national network, and an order for a shunt bank of 11,000-volt and 33,000-volt capacitors for use in South Wales—the largest single order for capacitors ever obtained by the Company and the first time that capacitors have been operated at this higher voltage in this country.

Dealing with overseas orders Sir Alexander mentioned an outstanding order from Queensland for 1,000 miles of transmission and distribution lines, an order for railway electrification in New South Wales comprising 236 single-track miles, and a particularly valuable order from North America for 1,250,000 yards of screened quad and aluminium-sheathed co-axial cables.

In dealing with research and development, the chairman referred to the shortage of copper and said that B.I.C.C. were devoting considerable technical effort to the possible uses of aluminium in certain processes. For example, two 33,000-volt pressure cables sheathed with aluminium by the "tube-sinking" process were installed during the year and the method has now been extended to telecommunications cables. The longer-term researches on methods of extruding aluminium in ways suitable for cable making are in progress with most encouraging results.

Company Shorts

Kundang Tin's Results for 1951.—Kundang Tin Dredging incurred a loss of £718 for the calendar year 1951. The company is incorporated in Malaya. Mr. W. M. Warren is chairman.

Geldenhuis Deep Pays 6d.—Geldenhuis Deep incurred a loss on the year's operations of £5,329. A dividend of 6d. (1s. 6d.) per 1s. share was paid absorbing £14,167 and the balance unappropriated at the fiscal year end was £91,057 against £110,597.

Anglo American Share Offer Result.—The political situation in South Africa and the lack of bids from continental sources were thought to be the two main reasons why underwriters were left with nearly 40 per cent of the recent one-for-ten share issue at £6 10s. per share, offered by Anglo American Corporation of South Africa.

Petaling Royalties Results for 1951.—Net profit of Petaling Royalties for the year ended December 31, 1951, after providing for all expenses including £2,758 (£2,801) for taxation amounted to £805 compared with £1,294. Dividend payments were maintained at 20 per cent, on the £22,503 issued capital in shares of 2s. each, which absorbed £2,363 leaving £790 to be carried forward against £853 in the preceding year.

Msauli Asbestos Quarterly Report.—The March quarterly report of Msauli Asbestos showed fibre production in the first three months of 1952 at 1,670 s.tons compared with 1,244 s.tons in the previous quarter. Estimated profit was £67,098 against £35,889—the substantial rise in profit being attributed to the increase in production as well as to the higher selling price.

Niger Valley Prospecting Abandoned.—Kaduna Syndicate, Kaduna Prospectors, and Maroc have announced that work on the special exclusive prospecting licence in the Niger Valley has been abandoned. The cost of each company's participation over a period of three years amounts to £2,900, the greater part of which in the cases of Kaduna Syndicate and Kaduna Prospectors will be written off by a transfer from general reserve.

Golden Horse Shoe (New) Results for 1951.—The profit and loss account of The Golden Horse Shoe (New) for the calendar year 1951 showed that net profit, after providing for all expenses, including £6,750 (£894) for taxation, was £5,676 to which was added £387 brought in making £6,063 (£5,281) available. The division of payment of 2d. (same) per 2s. share on the £110,000 issued capital absorbed £4,813 (£5,042) leaving £1,250 to be carried forward compared with £239 previously.

O.F.S. Makes Its First Profit.—The Orange Free State made an estimated working profit—its first—last month of £5,195 compared with a loss of £16,376 in March and £65,433 last December. Working costs in April were reduced by 2s. 5d. to 44s. 7d. while tonnage milled was 6,000 up at 94,000 compared with March.

The Transvaal's April working profit is put at £3,181,295 against £3,285,394 in March. Tonnage milled was reduced from 4,943,100 in March to 4,807,100, but working costs increased 4d. to 33s. 10d.

Jelapang Produces Less but Pays More.—Although the output of tin ore declined by 45 tons to 300 tons during the calendar year 1951, Jelapang Tin Dredging received an average price equivalent to £1,036, per ton metallic tins, as against £751 in the preceding year with the result that gross proceeds from the sale of tin advanced from £195,352 to £237,635. Net profit after providing for all expenses including £28,894 (£23,541) for taxation, amounted to £78,191 compared with £35,800 in the preceding year. Shareholders participated in the better results, receiving 10s. per £1 share compared with 8s. previously. The carry-forward at the fiscal year-end amounted to £73,319 against £37,128.

Oceana Development.—Oceana Development for the calendar year 1951 showed a profit before tax of £17,604 compared with £15,025 in the preceding year. Estimated liability to tax on the year's profits was £8,000 (£3,204). Investment reserve received £2,500 (£5,500), the dividend of 10 per cent (same) required £6,921 and after allocating £1,522 (£22,863) to the mineral rights reserve account and providing for all other appropriations, the carry forward amounted to £9,628 against £9,072.

Book value of the company's investments at the fiscal year end were shown in the balance sheet at £207,536, an increase over the previous year of £13,997. The market value at the same date was £169,593.

New Era Strengthens Its Reserves.—New Era Consolidated during the calendar year 1951 expanded its revenue from dividends, sharedealings and other sources to £197,576 compared with £174,057 in 1950. Expenses were virtually the same as in the preceding year and profit, before tax, figured at £173,285 against £151,661.

Taxation liabilities were considerably heavier, £40,500 against £16,600, the total dividend distribution of 1s. 1½d. per 5s. share (same) required £61,875 and £100,000 (£50,000) was allocated to general reserve bringing that account to £600,000. The carry forward at the end of 1951 amounted to £33,412 compared with £64,702 brought in.

Minerals Separation—a Year of Outstanding Achievement.—The statement by the chairman, Mr. J. N. Buchanan, in his address to shareholders accompanying the report and accounts of Minerals Separation for the twelve months ended December 31, 1951, that "the year has been one of outstanding achievement," is simply borne out by the results appearing in the consolidated profit and loss account. Gross income from trading profits and revenue received from dividends and interest rose from £186,930 to £301,270, the big expansion being due principally to the company's holdings in the prosperous Northern Rhodesian Copper belt companies. Expenses were modest and profit before tax amounted to £291,440 (£178,652). However, tax liabilities were appreciably heavier, £175,770 against £85,707, and net profit was reduced to £115,670 compared with £92,945 previously. The dividend distribution on the 5s. shares totalled 3s. 6d. (2s. 6d.) which required £80,850 and after allocating £1,209 to outside shareholders, the carry forward was £249,291 compared with £215,680 brought in.

The company intends to issue, sometime in August next, 120,000 new shares of 5s. each at 8s. 4d. per share to existing shareholders in the ratio of three new for every 22 held. The share issue is part of the company's unissued share capital and will raise issued capital from its present £120,000 to £150,000.

Uranium Prospecting at Randfontein.—At the annual meeting of Randfontein Estates held in Johannesburg on May 22 last, Mr. K. Richardson, vice-chairman, said the drilling programme in the current year was being carried out with the object of determining whether certain conglomerates which are found on the mine's property contain uranium. To date, the amount expended on capital account was approximately £40,000 which sum together with further sums will be appropriated from profits. The amounts charged to the capital account in respect of the programme are to be included in quantity reports from June 30, 1952.

Apex Mines Break Production Record.—Although Apex Mines' Greenside Colliery produced 1,082,590 tons compared with 1,034,502 tons in 1950, coal mining profit declined from £174,125 to £159,762 after transferring £2,742 to reserve account. Profit before tax amounted to £157,892 against £171,605. Taxation required more, £40,521 against £35,999, funds allocated for capital expenditure totalled £24,148 (£19,759) and after all other appropriations including £20,625 needed to service the 5¼ per cent redeemable cumulative preference shares of £1 each, maintaining dividend payments at 45 per cent on the £150,000 issued capital in ordinary shares of 10s. each and transferring £7,500 (same) to reserve for redemption of the preference share capital, the carry forward was £95,048 against £98,630 brought in.

Sharedealing Profits Expand "Writs" Profits.—Revenue for the year 1951 of West Rand Investment Trust from dividends, interest, sharedealing and other sources amounted to £721,231, an increase of £100,349 over the preceding year and due, said Sir Ernest Oppenheimer, in his statement accompanying the report and accounts, to increased profit on sharedealing. Accordingly, dividend payments were raised to a total of 1s. 4½d. per share as compared with 1s. 1½d. per share in 1950. The carry forward at the fiscal year end was £363,341 against £321,922 brought in.

Shares and interests in other concerns at cost were shown in the balance sheet at £9,150,522 compared with £8,917,376 in 1950, their market value at the same date being £18,937,980, an increase of £810,377 over the previous year's figure.

RIO TINTO COMPANY, LIMITED

IMPROVED TRADING RESULTS

HIGHER YIELDS FROM RHODESIAN HOLDINGS

THE EARL OF BESSBOROUGH'S SPEECH

The Seventy-ninth Annual General Meeting of Rio Tinto Co. Ltd. was held on May 22 at Winchester House, Old Broad Street, London, E.C.2, the **Rt. Hon. the Earl of Bessborough, G.C.M.G.** (the Chairman), presiding.

Mr. H. A. Mellor (London manager and secretary) having read the notice convening the meeting and the report of the auditors.

The Chairman said: Gentlemen, with your agreement I propose, as usual, to take the report and accounts as read. (Agreed.)

Proceeding to the accounts for the year 1951, it will be seen that the profit for the year, carried from revenue account to appropriation account, increased from £228,182 for 1950 to £944,015 for 1951, an increase of £715,833. Of this increase, £399,885 was due to the higher yields on your Rhodesian holdings, whilst on trading instead of a loss of £145,910 as in 1950, there was a profit of £144,164 for 1951.

The strength of the Rhodesian copper companies is remarkable, and as you have seen, this company has benefited handsomely from the extraordinarily successful year they enjoyed.

It is a matter for regret that so many overseas mining companies have been driven to take the control of their operations abroad, though we in this company from our own practical experience are well able to understand it, for we realize the weight of the extrusive pressure which the fiscal system brings to bear upon such enterprises.

ENCOURAGING OUTLOOK

Turning now to the company's trading position, members have had to wait a great number of years before the directors have been able to say that an improved outlook could be discerned for the company's Spanish business. However, the trading position did improve considerably during the year 1951 and, although the trading profit of £144,164 is small in comparison with the volume of trade done by the company, nevertheless, there are reasonable grounds for believing that the long-term trading prospects are brighter.

Over the year 1951 exchange rates in Spain remained stable and in consequence a halt was called to the necessity for making substantial adjustments in the annual accounts because of exchange movements. Nevertheless, the surpluses which were achieved during the year were mainly reflected in a large increase in the company's Peseta assets in Spain. This in itself might even be regarded as something of an embarrassment so long as British taxation regulations maintain the absurd provision that profits arising in foreign currencies are taxable, whether or not they are remitted or able to be remitted. However, at the end of the year, accompanied by the managing director and Mr. Gough, I paid a lengthy visit to Madrid, in the course of which, following interviews of a most friendly character with the Minister of Industry and the Minister of Commerce, arrangements were concluded for the resumption of sterling remittances. The implementation of these arrangements began immediately and certain sums have already been received. Your directors were given grounds to hope that these remittances would be continued.

I referred last year to the appointment of the Commission called Operation "P" to deal with the Spanish pyrites industry. Our relations with that body have been cordial and I should like to place on record our appreciation of the co-operative assistance rendered us by its members and of their understanding of the problems of the pyrites mines.

MINES IN SPAIN

The mines were in full production during the year and it is hoped that their productive capacity will be increased over the next year or two as a result of the Spanish Government having allocated $1,220,000 of the loan granted to Spain by the U.S.A. to the importation of plant and replacement materials which will be available for purchase by the Rio Tinto Mines. The labour supply is, however, at the moment only barely adequate for our needs. Sales of pyrites rose from 822,866 tons for 1950 to 951,175 tons for 1951. Rising costs have again overtaken the internal prices paid to the company for copper, sulphur and pyrites and your directors hope that too long a "time-lag" will not be allowed to occur before this disability is remedied by the authorities. It was the high price obtained for export pyrites which enabled the company to make Peseta profits.

Work at the mines continued uninterruptedly throughout the year under review and the directors are sure you will approve of the decision they made in December last to give a Christmas bonus to the Spanish staff and workmen amounting to about 4,000,000 Pesetas.

During the visit to Madrid to which I have alluded I had the honour of an audience with the Chief of the State. I was also most courteously received by the Minister of Foreign Affairs.

BALANCE SHEET

The market value of quoted investments has again increased and at the end of 1951 stood at £13,935,648.

EXPLORATION WORK

As stated in the directors' report, the Board intends actively to pursue the examination of prospects in Africa and elsewhere as opportunity permits. Prospecting, it should be realized, is a long-dated programme and it is likely to be some time before anything will merit special mention.

ADMINISTRATION

No changes in the directorate have occurred since our last meeting. As you will have seen from the notice of the extraordinary general meeting which is to follow, certain amendments to the articles are being proposed which, with your approval, will, I hope, facilitate the day-to-day administration of the company.

DIVIDEND

As you have already been informed in the directors' report, the Board recommend that the dividend on the Ordinary shares be 15 per cent, free of tax, and that these shares should on this occasion receive in addition a bonus of 20 per cent, free of tax, on account of the extraordinary increase in Rhodesian investment income in 1951.

At the same time, the carry-forward on appropriation account would be increased from £1,002,943 to £1,154,862.

THANKS TO STAFF

In conclusion, it is a privilege and pleasure to me on behalf of the Board and also in your name to thank the management and the whole of the staff both in this country and abroad for their continued devotion to your interests. Your company is splendidly served and you have every reason to be proud of those who serve you.

The report and accounts were adopted and a dividend of 15 per cent, free of tax, and bonus of 20 per cent, free of tax, were approved.

The retiring directors, Mr. G. E. Coke and Sir Mark Turner, were re-elected and the other formal business was duly transacted.

At the subsequent extraordinary general meeting resolutions amending the articles of association were approved.

The proceedings then terminated.

ASHANTI GOLDFIELDS CORPORATION LIMITED

PRODUCTION COSTS REDUCED

The Fifty-fifth Annual General Meeting of the Ashanti Goldfields Corporation Ltd. was held on May 21. **Major General Sir Edward L. Spears, K.B.E., C.B., M.C.,** the Chairman, presiding, said that the total of Share Capital, Share Premium Account and Reserves was £3,206,795. Extracts from his circulated statement, which was taken as read, are:—

REDUCTION IN OVERALL PRODUCTION COSTS

During the year prices of all essential stores were higher. Thanks to efforts to make economies wherever possible, and by milling greater tonnage, they had been able to reduce the overall production costs per ton by 1s. 8d., that is from 59s. 7d. to 57s. 11d.

From the beginning of last October they had been able to sell a maximum of 40 per cent of total output on the Free Market and this had produced an extra return of between £6,000 and £6,500 a month.

In the Appropriations, Profits Tax require £309,000 and Income Tax, including Gold Coast Tax, £334,624, a total of £643,624. This was an increase of £193,799 on the already high figures of the previous year and in addition they were paying £3,155 more for Royalty to the Gold Coast Government and £24,921 more for Gold Duty. The total payment to the United Kingdom and the Gold Coast Governments together was no less than £950,912 compared with £729,046 in 1950. As it was pointed out last year, this latter figure was over a quarter of a million more than the amount paid the year before.

DIVIDEND

On November 6, 1951, they paid an Interim Dividend of 1s. per Unit of Stock less tax of 9s. 6d. in the pound. After adding £25,000 to the Fixed Assets Replacement Reserve and taking £13,654 for the Staff Pension Fund the most the company felt able to recommend as a Final Dividend, having regard to the need to conserve resources, was 1s. per Unit of Stock less tax at 9s. 6d. in the pound. The total gross distribution for the year would thus be 2s. per Unit of Stock and they can carry forward £226,909, an increase of £13,402. It was a great satisfaction to the Board to be able to increase the distribution from 1s. 7.2d. per Unit for 1949 to 2s. 6d. per Unit in 1950, and it was a great disappointment not to be able to maintain the same level this year.

OUTPUT

Turning to the operation of the mine itself, the Chairman said that in the period under review, progress in some directions had been counterbalanced by disappointment in others. The increase in tonnage treated, which was so satisfactory a feature in the previous year's result, was maintained, but actual gold production was slightly less. This was in accordance with their policy of exploiting the low grade deposits which had been made available by development work in recent years.

LABOUR

The heavy programme of public works planned by the Gold Coast Government and the large construction schemes also contemplated may well lead to labour difficulties. In an effort to insure the gold mining industry against possible shortage of the right type of labour they had combined with a number of other producing mines to organize recruitment in the Northern Territories. It was to be hoped that the Government on the Gold Coast and here at home would show a greater realization of the economic realities than had been the case hitherto. Some appreciation of the gold mining industry's difficulties had been reflected, however modestly, in the new Mineral Duties Bill. It was something that the impost of the 5 per cent Royalty carried by the Corporation in addition to the heaviest taxation had been abrogated, and the extra 1s. Income Tax to which only mines were subject had been abolished, but the burden was still unreasonably high as he had pointed out earlier in his remarks on the Balance Sheet. The Corporation and its sister Company, Bibiani, spent more than £447,000 on stores and equipment in the United Kingdom during the period covered by the account.

LATEST REPORTS

Addressing the meeting the Chairman said that the latest reports from the mines showed that the temporary set-back to production in February and March was being overcome and output was again rising to the normal level. There was, however, still a shortage of labour, which was a cause of some anxiety.

He referred briefly to the saving which accrued to the Company from the new Minerals Duty. The present scale of duty showed a substantially lower liability than the Company had formerly under the combined heading of Gold Duty and Royalty. Next September, the Company would have to face a non-recurring charge for the accrued portion of the increased African gratuities agreed as part of the settlement on the wages question.

BIBIANI (1927) LTD.

PROGRESS DESPITE DIFFICULTIES

SATISFACTORY YEAR'S WORK

At the Annual General Meeting on May 21, 1952, the Chairman, **Major General Sir Edward L. Spears, K.B.E., C.B., M.C.,** expressed their great regret at the resignation of the Rt. Hon. Duncan Sandys on his appointment as Minister of Supply. They had been fortunate in having secured for the board the services of Mr. F. J. Erroll, M.P., and Mr. Roland Outen.

This year the Company had altered its style and method of drafting its Balance Sheet and presented it in columnar form.

The company had added £25,000 to the Fixed Assets Replacement Reserve, raising it to £100,000 and £25,000 to General Reserve on Capital Account which was now £125,000.

CURRENT ASSETS

The Company's Stores and Plant in hand had increased by £72,165 to £437,471, a very high figure. They had deliberately built up their physical stocks of consumable stores to a high level, higher than they would have done in more settled times. As a result they had large stocks of essential stores mainly purchased at lower prices than now ruling.

CURRENT LIABILITIES

Current Taxation due had risen from £56,466 to £142,030. This was because it included the Gold Coast Income Tax and British Income Tax on the profits for the year to September, 1950, which were much higher than those in 1949. These Income Taxes were reserved in the accounts for the year 1950 following their practice of reserving for tax on all the profits to the date of the accounts.

PROFIT AND LOSS ACCOUNT

He had given a warning last year that expenses were rising. Mining costs were about £75,000 higher than in the previous year. Prices of all stores were higher and there were also increases in the cost of freight, carriage and other expenses. In addition African Wages were increased on October 1, 1950, following a general rise in rates on the Gold Coast. As a result, the Company's cost per ton increased by 2s. 11d. in spite of the greatest care and economy.

The anxiety as to constantly rising costs against a fixed selling price for their gold was only partly relieved by having been given permission to sell part of their output on the free market at a higher price. After much delay permission was given for up to 40 per cent of the gold produced after October 1, 1951, to be sold at the best price obtainable subject to some safeguards. As the Company could not do this prior to October, 1951, the present accounts do not show any benefit from these sales but since then they have produced an extra return of about £2,800 per month.

Besides these extra costs the Company had this year paid £23,275 to the Gold Coast Government as Gold Duty. For the current year it was estimated that owing to the fall in profits the charge to Gold Duty would be reduced to between £400 and £450 per month on present output up to March, 1952. After that date the charge is likely to be still further reduced under the new Minerals Duty which is to take the place of the Gold Duty.

DIVIDENDS

The Company paid an Interim Dividend of 4d. per Unit of Stock on November 6, 1951, and they recommended a Final Dividend of 6d. per Unit of Stock making for the year a payment of 10d. per Unit less tax at 9s. 6d. in the £. This would mean withdrawing £2,189 from the profits brought forward so that the balance carried to next year would be £181,669.

PROGRESS AT THE MINE

The result of the year's work in West Africa was satisfactory. Output was increased to 352,641 tons yielding 74,868 oz. of gold. This improved tonnage had been carefully planned to maintain the gold output in view of the lower average value for mining underground. The surface quarry contributed an increased quota and the balance between underground and surface production is being comfortably maintained.

Development, generally speaking, was more satisfactory than during the previous year. New ore developed more than replaced that mined and showed an improvement in value. Results were confined mainly to the south ore body on the lower levels of the mine and work here was being accelerated. In the current year's programme the emphasis was on the provision of adequate means for continuing development in depth and priority was, therefore, being given to the connections between the existing shafts and the projected internal shaft on No. 18 level. Reef exploration here would be somewhat restricted until later in the year and the absence of information on results from recent quarterly reports need cause no anxiety. This will follow later when the more urgent work has been competed.

SAN FRANCISCO MINES OF MEXICO

The Thirty-ninth Annual General Meeting of San Francisco Mines of Mexico Ltd., was held on May 16 in London, **Mr. C. E. Temperley, O.B.E., M.C.** (the chairman), presiding.

The following is an extract from his circulated statement:

The gross value of the products sold by your company during the year under review was £9,547,000 against £7,977,000 in the previous year. The net profit for the year was £1,022,000 against £818,000.

Under Mexican law a rebate of dividend tax, which is quite a heavy burden on the company, is obtainable on an amount credited in the Mexican books of the company to a reinvestment reserve equivalent to 10 per cent of the profits in Mexico after charging Mexican income tax and Mexican excess profits tax—but this rebate is only obtainable if the appropriation to reinvestment reserve is specifically approved by the stockholders at a general meeting of the company. To obtain the benefit of this concession the directors have appropriated the corresponding sterling amount of £225,000 from profits for the year and have credited this sum to a reinvestment reserve in the balance sheet of the company as at September 30, 1951—and stockholders will be asked to pass the resolution regarding this reserve which is set out in full in the notice convening the meeting. This procedure is an unusual one for companies registered here, but your directors consider the saving in Mexican tax is sufficiently important to justify asking stockholders to pass the resolution.

Finally, the directors recommend the payment of a dividend of 6s. per unit on the increased capital. The profits for the year justify this relatively large increase in the rate of dividend but I must point out that substantial adjustments in respect of previous years are included in the profit and loss account and that these will not recur in the current year—while, in addition, the company will in future be subject to British excess profits levy. After deducting British income tax at 9s. 6d. in the pound, this dividend will absorb a net sum of £648,000. After charging directors' additional remuneration of £5,000 there remains an amount of £270,000 to be carried forward to the new year.

The satisfactory financial results of the year reflect the higher metal prices ruling and are the best on record. The tonnage milled, however, was 597,000 or 26,000 tons less than the tonnage milled in the previous year. The increase in production forecast in my speech last year was not realized. This was largely a result of power shortages arising from an extremely dry season which affected the power available from the Boquilla dam and from the need to service some of the power company's plants. The position improved in November last and the power supply was fully restored in January of this year.

Slightly more than 5,700 metres of underground development work was done during the year—a small increase over the previous year. Of this total, however, no less than 417 metres consisted of shaft sinking, which is the highest sinking meterage in any year on record. The ore reserves of the Frisco and Clarines mines, re-estimated as of September 30, 1951, totalled 4,209,000 tons, as compared with 4,164,000 tons at the end of the previous year and assayed the satisfactory grade of 6.5 per cent lead, 9.4 per cent zinc, 0.7 per cent copper, 0.7 grammes gold, and 158 grammes silver. At the current rate of milling these reserves are equivalent to nearly six years' mill supply.

The burden of taxation on your company continues to increase. During the year the rate of Mexican income tax was increased from 30 to 33 per cent and the company paid the Mexican excess profits tax for the first time.

The United Kingdom Finance Bill introduces an excess profits levy which will be payable by your company. It is not yet possible to assess what amount will finally be payable, as this depends on the extent to which the bill is amended as a result of the strong representations now being made by the British Overseas Mining Industry.

Base metal prices were firm during the year. The United States ceiling prices, imposed in January, 1951, were substantially below the prices obtainable outside the U.S.A., and the wide differences that existed finally forced the United States Government to raise its ceiling prices for lead and zinc by 2c. per lb. in October, 1951, bringing these prices to 19c. and 19½c. per lb. respectively. Since the year-end foreign prices have tended downwards towards those new ceilings. As from February 12, 1952, the United States import duties on both lead and zinc were suspended—with the provision that the duty would be reimposed if the price of either metal should fall below 18c.—thus helping further to reduce the price differential between United States and foreign markets.

New long-term agreements have recently been concluded with Cia Metalurgica de Penoles, S.A., a Mexican affiliate of the American Metal Co., for the treatment of your company's lead concentrates, and your directors believe that these agreements will prove to be of mutual benefit to the parties concerned.

The report was adopted.

BRITISH INSULATED CALLENDER'S CABLES

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STULTIFYING INCIDENCE OF TAXATION

The Seventh Annual General Meeting of British Insulated Callender's Cables Ltd., will be held on June 12 in London.

The following is an extract from the statement circulated by the chairman, **Sir Alexander Roger, K.C.I.E.:**

In the parent company profit on trading has risen by £1,352,629 to £4,585,668 mainly due to the substantial increase both in the volume and value of our output for 1951, the advantages of a full order book, and the benefits of a constant improvement in methods and machines.

Taxation requires £2,707,881 or £643,244 more than in 1950 mainly due to the improvement in our trading profit and the increased profits tax payable on distributed profits.

With our wide ramifications and the many uncertainties of present and future conditions, the constant strengthening of our revenue reserves must remain an essential feature of our financial policy, and in addition to the new reserve for "replacement of fixed assets" of £1,000,000 which has been created, we have transferred from this year's profits a further £500,000 to general reserve.

In the balance sheet, the outstanding feature is the greatly increased monies tied up in stock, work-in-progress and debtors and, as a consequence, that as compared with a balance at banks and in cash of £615,608 at December 31, 1950, we had a bank overdraft at December 31, 1951, of some £3,500,000 in addition to the loan of £2,000,000 which we arranged some years ago and which under present arrangements is repayable by June 30, 1955, at the latest.

NEW ISSUE AN OUTSTANDING SUCCESS

Your directors decided some months ago that further permanent capital was required in the business and decided to obtain this by the offer to existing Ordinary shareholders of £3,109,614 of Ordinary capital on what we consider to be attractive terms. As is now well-known, the issue was an outstanding success and has brought in some £3,340,000 of new cash.

If the inflation which our previous Government did little or nothing to control is now to be held, if Britain is not only to surmount her present difficulties but continue to hold her rightful place in the world, the present stultifying incidence of taxation and the volume of non-revenue earning Government expenditure must be reduced. At the very least it slows down the ability to undertake capital expenditure and developments so essential to British industry not only in maintaining but in constantly improving its competitive power in the world. And at the worst it stifles human initiative and makes more and more difficult the achievement of that greater and more efficient output per person without which this country will not for long remain solvent.

I welcome the initial steps taken by the present Government to control expenditure and, through some small relief in personal taxation, to give some encouragement to greater endeavour. But I most fervently hope that further and stronger action will soon be seen under both these heads.

The introduction of copper rationing at the end of 1950, the shortages which have persisted throughout the year of this and such other vital materials as steel, the inadequate supply of skilled engineering personnel, and our endeavours to deal equitably with the competing demands for our products, are the main factors which have combined to make 1951 a year of many problems to our production organization. It has been impossible to overcome wholly certain shortages and to keep pace with the demands for all our products. By increasing the output of others through making the best use of available resources, introducing in certain instances new or substitute materials, and obtaining the benefits of the constant improvement and expansion of our incentive schemes and plant efficiency, we have, however, been able to achieve a gradually increasing overall volume of production.

THE OUTLOOK

We have made a satisfactory start to 1952. Following the receipt of certain badly wanted materials towards the end of 1951 we have been able to complete a considerable proportion of partly finished stocks then held and to increase our overall production still further. Sales for the three months to March 31, 1952, show a marked improvement over those for the first quarter of 1951. We have also a full order book and altogether the prospects for 1952 look good provided—and it is an important proviso—our essential raw materials continue to be made available to us.

Apart from the intensive work we are doing on substitute and alternative materials, there is little we can do as we continue to obtain the great bulk of our vital raw materials through Government departments. I know they appreciate the position and am confident they will continue to do everything to help.

Mining Matters

I.M.M. Awards.—The Council of The Institution of Mining & Metallurgy have announced that the Gold Medal of the Institution has been awarded to **Dr. George Kenneth Williams** in recognition of the importance of his work in connection with research into the metallurgy of lead and zinc and the development of metallurgical processes. **Mr. Hubert Edmund Jeffery** was awarded the Consolidated Gold Fields of South Africa Ltd. Gold Medal for 1951 for his paper, "Notes on Fire Prevention and Fire Fighting with particular reference to the Kolar Goldfield" (*Transactions*, Vol. 60); and **Mr. R. Cornthwaite** and **Mr. R. Frank Juretic** were awarded conjointly the Consolidated Gold Fields of South Africa Ltd. premium of 40 guineas for their paper on "Sinking of Irwin Shaft at Roan Antelope Mine," (*Transactions*, Vol. 60).

Mr. Thomas A. A. Quarm was awarded the Arthur Claudet Student's Prize for his paper, "A Method for the Preparation of High Purity Iridium Metal" (*Transactions*, Vol. 60); and **Mr. Anthony Phillip Millman** has been awarded the William Freshaville Students' Prize for his part authorship of the paper, "Heavy Metals and Vegetation as a Guide to Ore"; a bio-geochemical reconnaissance in West Africa (*Transactions*, Vol. 60).

Honorary Membership of the Institution has been conferred on **Mr. Edward Hooper**, in recognition of his services in the development of the Institution from its foundation 60 years ago, and on **Mr. Edward Duffield McDermott** in recognition of his services to the Institution and to mining and metallurgical education.

Inco Board Changes.—**Dr. Paul D. Merica** has been elected president of the International Nickel Co. of Canada in succession to **Dr. John F. Thompson**, who will however continue to act as chairman and chief officer of the company. **Mr. R. Leslie Beattie** and **Mr. H. C. F. Mockridge** have been elected to the executive committee of the board. **Mr. J. R. Gordon**, assistant vice-president, has been appointed to the further post of assistant general manager and **Mr. William F. Kennedy** has been named secretary of the company in succession to **Mr. Henry S. Wingate**, who will devote his full time as a vice-president and a director of the company.

The Governments of Malaya and Singapore Announce Title Changes.—The Governments of the Federation of Malaya and of Singapore announced on May 15 last, that as from that date the Agent for Malaya would now be known as the Commissioner for Malaya in the United Kingdom and that the Deputy Agent would now be known as the Trade Commissioner for Malaya in the U.K.

The Camborne School of Mines held their annual dinner at Tonkins Restaurant, Camborne, on Friday, May 23.

MINE SURVEYOR required for British owned Mine in Egypt; some experience underground sampling and ore reserve calculations desirable; healthy desert climate; two years contract in first instance, renewable; pension scheme; free furnished accommodation, passage (including family), and medical attention. Write Pannell, Crewdson & Hardy, 9, Basinghall Street, London, E.C.2, giving full particulars training and experience and salary required.

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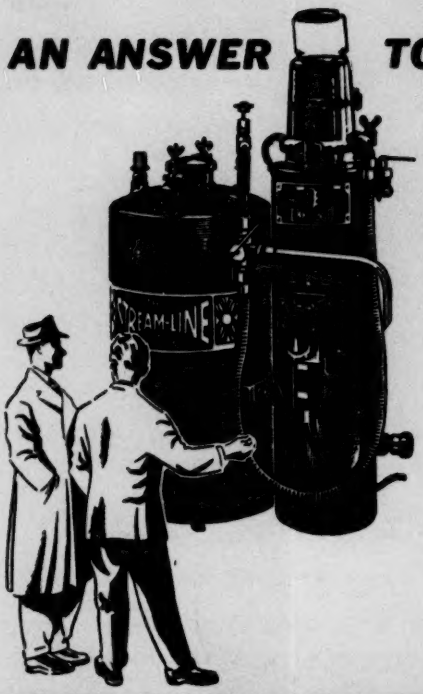

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Published by The Mining Journal Ltd., 15 George St., London, E.C.4, and printed by Samuel Sidders & Son Ltd., 115 Salusbury Road, London, N.W.6.
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